VOL. LXXIX PART ONE

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

JANUARY 1954

PAGE

The Secretary's Page 1

Notes from Wisley 3

Perpetual Flowering Carnations. By MONTAGU C. ALLWOOD, F.L.S., V.M.H. *Illustrated* 6

The New Code for the Naming of Cultivated Plants. By J. S. L. GILMOUR 12

Buddleia × Pikei. By H. R. FLETCHER. *Illustrated* . . 21

Curtis's Botanical Magazine. *Illustrated* 23

The Genus Agapanthus. By THE HON. LEWIS PALMER. *Illustrated* 25

Some Aspects of Spring Frost Damage to Fruit and its Control. By W. S. ROGERS. *Illustrated* 29

Plants and Problems 37

NOTES FROM FELLOWS:

Eucryphia 'Nymansay'. By W. F. HAMILTON. *Illustrated*. 43

Sophora tetraptera. By A. F. BAKER 43

Ceanothus velutinus. By C. BERKELEY 44

Plants to which Awards have been made in 1953 45

Book Notes 46

VINCENT SQUARE, LONDON, S.W.1

COMPOSTS for all crops

THE VERY BEST OBTAINABLE

	cwts.	56lb.	28lb.	Trial carton
John Innes Seed	16/6	11/–	8/–	3/6
John Innes				
Potting No. 1	16/6	11/–	8/–	3/6
Potting No. 2	17/–	11/6	8/3	3/6
Potting No. 3	17/6	12/–	8/6	3/6
Potting No. 4	18/–	12/6	8/9	3/6
Cactus Compost	21/–	13/3	9/–	3/6
Lawn Compost (sterilised)	21/–	13/3	9/–	3/6
Granite Chippings	14/6	9/9	7/6	3/6
Limestone Chippings	14/6	9/9	7/6	3/6
Leaf Mould, Sifted	20/–	13/–	9/–	3/–
Loam (rotted top soil)	12/–	8/6	6/9	—
Loam (sterilized and sifted)	14/–	9/6	7/3	3/3
Peat (granulated)	19/6	12/9	8/6	3/–
Potting Grit	13/6	9/3	7/–	3/3
Sand, Silver	13/6	9/3	7/–	3/3
Shingle	13/6	9/3	7/–	3/3

Other types available

	cwt.	56lb.	28lb.	14lb.
Basic Slag	16/6	11/–	8/–	4/6
Bone Meal	44/6	25/6	14/6	9/–
Bone Flour	35/–	19/6	11/–	6/9
Clay's Fertilizer	46/–	26/6	15/–	—
Hoof and Horn	62/6	34/6	18/6	10/6
Fish Manure Compound	41/–	22/6	12/6	8/6
John Innes Base	54/–	30/–	17/6	10/–
John Innes Liquid Feed	50/–	28/–	16/6	9/6
Lawn Sand	40/–	23/6	13/9	8/3
National Growmore	42/6	25/–	14/9	8/6
Spent Mushroom Manure	15/6	10/3	7/6	5/–
Sulphate Ammonia	26/–	14/6	8/6	5/3
Sulphate of Potash	38/–	21/–	11/9	7/3
Superphosphate of Lime	27/–	15/–	8/9	5/6

Other types available

Quantity discount: for cash with order; 5 cwt. lots less 6d. per cwt.; 10 cwt. lots less 9d. per cwt.; 20 cwt. lots less 1/– per cwt.

All carriage paid, England and Wales, Scotland plus 2/–. Mainland only, in Railway free delivery area. Orders booked for forward delivery. Instructive brochure on Composts and their uses, gladly forwarded on receipt of 3½d. stamp. Complete price list from:

E. J. WOODMAN AND SONS

NURSERYMEN AND SEEDSMEN

DEPT A.1, 19–25, HIGH ST., PINNER, MIDDX. Tel. PIN 802 (7 lines).

---

manganese . . .

Plants cannot grow and produce healthily without a sufficient supply of the element manganese. Information and a descriptive leaflet about manganese in the nutrition of plants and animals may be obtained from our Agricultural Department.

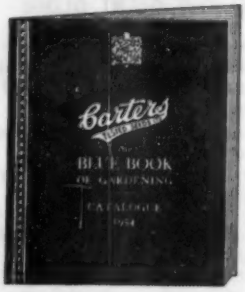
For supplies of manganese compounds you should apply to your local merchant. If he cannot help, please communicate with us.

CHEMICAL & CARBON PRODUCTS LTD.

[illegible] ST. GEORGE STREET HANOVER SQUARE LONDON W1

Telephone: MAYfair 7132 Cables: CHEMICARBO LONDON

CARTERS TESTED SEEDS



Selected for Strain and Quality

The "Blue Book of Gardening" Catalogue

Free on Request

Carters TESTED SEEDS LTD

Attractively illustrated and containing the widest possible selection of Flower and Vegetable Seeds, Bulbs for Spring Planting, including Gladiolus, Grass Seeds, and all Garden Fertilisers and Sundries

RAYNES PARK, LONDON, S.W.20

The Largest Marquee in the World!

Erected at the Chelsea Flower Show 1951–1953 by PIGGOTT BROTHERS & CO. LTD.

The supply and erection of a marquee such as the one illustrated calls for specialised knowledge and extensive experience. Piggotts have been experts in these matters for over 170 years. Whatever you require—a large marquee or a small tent for a social function—you will find that Piggotts are the best people to provide this service

PIGGOTT BROTHERS & CO LTD

Established 1780

220–226 BISHOPSGATE, LONDON, E.C.2

BIShopsgate 4851 (9 lines)

RUSSELL'S

GOLD MEDAL

TREES AND SHRUBS

Please send for our 1953/4 Catalogue listing many hundred old and new varieties of worth-while Trees and Shrubs, including:

CAMELLIAS
JAPANESE FLOWERING CHERRIES
FLOWERING CRABS
HAMAMELIS (Witch Hazel)
JAPANESE MAPLES
FLOWERING PEACHES
EVERGREEN AND DECIDUOUS AZALEAS
MAGNOLIAS
VIBURNUMS, etc., etc.,

L. R. RUSSELL LTD.,
Richmond Nurseries,
WINDLESHAM, SURREY

ONION SETS

MARSHALL'S SPECIAL NON-BOLTING YELLOW GIANT GLOBE

These specially treated little bulbs will produce an excellent crop of large golden skinned onions on almost any soil and often reach a huge size.

About one month earlier than onions from seed and fine long keepers. Also practically immune against onion fly and very resistant to mildew. Ideal for private or commercial use and suitable for exhibition. Scores of genuine testimonials testify to their popularity. Not to be confused with ordinary imported sets. Book now for March delivery. 4/9 per 100, 30/- per 1,000 C.W.O. Carr. paid. Special quotations for quantities to Institutions, Schools, Allotment Societies etc. Cultural instructions free, also our illustrated General Seed List.

S. E. MARSHALL & CO.
THE ONION SPECIALISTS
(Depot R.) WISBECH, CAMBS.

STUART LOW CO.

CAMELLIAS—A fine selection of heavily budded bushy plants in all the leading varieties.

ACACIAS—Heavily budded plants for Spring flowering.

CARNATION ENFIELD PINK—A stronger growing improvement on Ashington Pink. Also all other leading varieties.

Other specialities including **CYCLAMEN HIPPEASTRUM** (Amaryllis) **HOUSE PLANTS** and **ORCHIDS.**

A copy of our General List including Pot Plants, Roses, Fruit Trees, Flowering Trees and Shrubs, and Conifers will be sent on request to:—

STUART LOW CO.,
Royal Nursery,
BUSH HILL PARK,
ENFIELD, MIDDX.

SWEET PEAS

(ENGLISH GROWN)

NOVELTIES. EXHIBITION AND CUT FLOWER VARIETIES FOR 1954

Among the more than 70 outstanding varieties offered are

CHRISTINA (Bolton)
ROSELLA BLAKE (Bolton)
BRIGHT EYES (Bolton)
AUDREY (Cullen)
CREAM ELEGANCE (Dobbie)
CRIMSON MONARCH (Dobbie)
ODETTE (Dobbie)
CRINOLINE (King)
GERANIUM PINK (Stark)
KING CARDINAL (Stark)
MADGE (Stark)
ORANGE DELIGHT (Woodcock)

A full descriptive list is available and will gladly be forwarded on request.

C. E. HENDERSON & SON,
SEEDSMEN,
48-52, LEADENHALL MARKET,
LONDON, E.C.3

There's NO substitute for

CUPRINOL

for lasting preservation and economy because

★ **CUPRINOL** is the most effective preservative known for seed boxes, glasshouses, staging, stakes and all other horticultural timber. Also for netting, canvas and hessian.

★ **CUPRINOL** gives lasting protection from all forms of Rot and Boring Insect attacks.

★ **CUPRINOL** is easy and quick to apply by brush, spray or immersion. No special equipment necessary. Drying time is much shorter than with water soluble products.

★ **CUPRINOL** S.Q.D. Green is the grade recommended for horticultural use; once dry it is *absolutely safe in contact with growing plants.*

★ **CUPRINOL**-treated timber is clean to handle and can be painted or varnished.

★ **CUPRINOL** is manufactured up to a very high specification and *not* down to a price. Refuse imitations which are not Cuprinol.

Full information, advice and supplies from:

CUPRINOL LIMITED

86, Carpenter's Road, Stratford, London, E.15

Telephone: **MARyland 4483.**

Good Gardens begin with...

Webbs' *Garden* Guide

Our new 1954 Garden Guide is now available. Essential to the keen gardener—Full of practical information and hints on the garden month by month; complete details of old favourites, new strains and specialities of WEBBS' Pedigree Flower and Vegetable Seeds, Lawn Seeds, Plants, Seed Potatoes, Bulbs, etc.

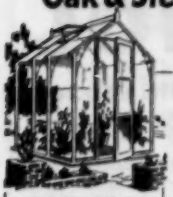
Webbs'

Dept. 23, WORDSLEY

STOURBRIDGE

OAKWORTH

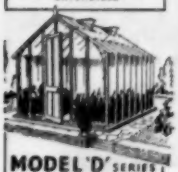
Oak & Steel construction



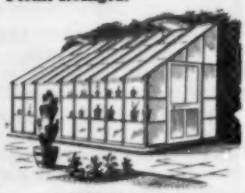
ensures
tremendous strength
and maximum light

Scientifically designed to grow more and last a lifetime. Wide range of types and sizes made in prefabricated units. All models extendible. Free Delivery, Erection Service and Deferred Terms arranged.

DOUBLE 'Z'
MODEL
£19.15.0
EXTENDIBLE



MODEL 'D' SERIES
8' 2" wide
Lengths from
7' 1" to 19' 2"



LEAN-TO SERIES
STRAIGHT SIDES
Widths, 4' 1" to 6' 7" Lengths, 8' 3" to 17' 6" Ht. to Ridge, 7' 4" to 8' 9" Ht. to Eaves all sizes 5' 0"

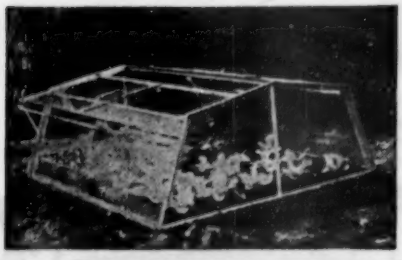
***FREE*-send for Catalogue JRH**

Containing illustrations and full details

Your Name _____

Address _____

CASTOS LTD., Wellington, Shropshire



"PLUIE MINOR" FRAME

THE PERFECT FRAME

Stocked by leading Stores and Ironmongers

Ensures PERFECT VENTILATION—So necessary to prevent condensation and damping off. Size 41" long × 38" wide × 15½" high. Special features include:—

- ★Strong steel—¼" thick.
- ★Cold galvanised or zinc sprayed.
- ★Top can be opened both sides instantly by handles.
- ★Sliding glass top and sides (no putty).
- ★No loose clips or screws.
- ★Can be extended without extra ends.

1 frame complete with glass
Carr. 5/- extra
(Glass case returnable)

£5 10s.

Before purchasing a frame make sure you see the "Pluie Minor." It is worth waiting for.

POULTMURE LTD. (Dept. R.H.S.)
5 COLLEGE ROAD, HARROW, MIDDLESEX.

WHEN PEOPLE SAY...

as they admire your garden, "How on earth do you do it?" you will reply: "By using Flexible Earth. That way you can't fail." Hundreds of gardeners have proved that this complete organic "soil structure" wonderfully invigorates all plant growth—so

PRODUCING WONDERFUL BLOOMS

"I have used Flexible Earth and am delighted with the result. The plants are growing much better and are producing wonderful blooms. Please send me another hundredweight."
—Mrs. E. L. Golden, 4 Westfield Close, Withdean, Brighton, 6.

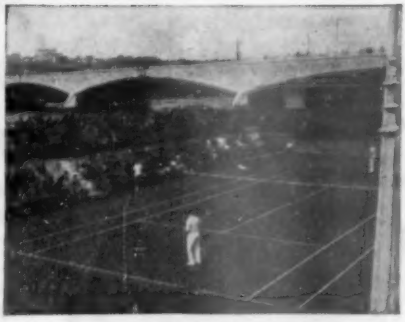
THERE MUST BE SOMETHING IN FLEXIBLE EARTH

14 lb. 6/6
28 lb. 13/-
56 lb. £1 2s. 6d.
1 cwt. £2 0s. 0d.

Carriage paid nearest station or post paid home where possible. Cash with Order. Buy from your local dealer, or if in difficulty send a 1/- stamp and a large envelope for 48-page booklet explaining the secret of how to win prizes. 1/- refunded against subsequent order.

THE CORNISH FLEXIBLE EARTH Co.
52, LANIVET, BODMIN, CORNWALL
London Showrooms: 52 "The Cornish Jungle," 228 Strand, W.C.2. (Opp: Law Courts.) CEN 8195.

GRASSPHALTE LTD



SOUTH BANK PROMENADE
For The London County Council

For 30 years the Surface for Service!

BAFSC

YOU CAN DO A GOOD DEAL BETTER WITH GRASSPHALTE

HAMPTON HILL, MIDDLESEX. *Molesey 5167 & 3799*

SEEDS

KNOWN AND
GROWN EVERYWHERE
—from the Raisers with nearly 100 years' experience and Winners of over 250 awards

Our VEGETABLE and FLOWER Seeds are all specially selected strains of the tested leading varieties. Our comprehensive collection includes many of the delicious NEW VARIETIES of Culinary Peas for which we are world famous. These include:

A New Pea for 1954—LAXTON'S EARLIEST
The earliest of all wrinkled varieties. Really outstanding: large blunt-ended pods, well filled with high quality peas. True marrow flavour. Height 3 ft.

LAXTON'S EXQUISITE A.M., R.H.S.
Fully wrinkled Marrowfat. Long, large pods. Outstanding crop and quality. Height 3½ ft.

LAXTON'S SUPERB. The finest semi-wrinkled Early Pea yet raised. Very early, with large pods filled with 9-10 marrowfat peas of delicious flavour. Height 2 ft.

★ **Send for your free copy of our Seed Catalogue NOW**

Laxton's
THE FINEST NAME SINCE 1860

FRUIT TREE RAISERS
NURSERYMEN & SEEDSMEN
LAXTON BROS. BEDFORD LTD
63H HIGH STREET · BEDFORD

BATH'S
REGAL PHLOX

BRILLIANT
1953 INTRODUCTIONS

All the varieties are remarkable for their robustness, vigour and magnificent flower trusses—the side branches are exceptionally well furnished with pips of outstanding size and beautiful formation.

Balmoral. Amaranth rose overmarked with Persian rose. Most attractive pips making a beautiful truss. 2½-3 ft. Distinctive light foliage, good contrast .. .. each 5/-

Sandringham. Persian rose with slightly darker centre. Well-formed pips building up into a magnificent flower truss. Height 2-2½ ft. Beautiful dark foliage .. .. each 5/-

Windsor. Bright carmine with most distinctive magenta eye. Huge trusses of bloom, good-sized pips. Tall, 2½-3 ft. A wonderful plant for the back of the border .. .. .. each 5/-

Glamis. Rhodamine pink; with a Tyrian-purple eye; a lovely combination. Compact growth, medium height, 2-2½ ft. Ideal for the front of a border .. .. each 7/6

Marlborough. A lovely orchid-purple enhanced by a beautiful dark bronzy-green foliage which shows up the magnificent trusses to perfection. Medium in height, delightfully compact each 7/6

One plant each of these above novelties for 25/- carriage paid

R. H. BATH LTD.
THE FLORAL FARMS, WISBECH, CAMBS.

LAWN GRASSES

The following are our standard mixtures which we recommend with every confidence.

(No. 1) Will produce the finest quality turf for Bowling Greens, Putting and Golf, and for the creation of the very Finest Lawns. Entirely free from Rye Grass and without Clover. 6/- per pound

(No. 2) Containing Rye Grass, a very popular mixture with Hard Wearing qualities. Very suitable for sowing on all types of soil. Recommended for Lawns, Tennis Courts and Cricket Fields. Without Clover. 3/9 per pound

(No. 3) A mixture containing Rye Grass. Kept well cut makes an excellent lawn which will withstand the Hard Wear of a Playing Field. For Playing Fields, Parks and Fairways. 2/3 per pound

(No. 4) Specially blended with fine grasses. All suitable for Growing Under Trees and in Shady Places. 6/- per pound

Special mixtures will be quoted on application.

C. E. HENDERSON & SON
— SEEDSMEN —
48-52 LEADENHALL MARKET, E.C.3

LIGHT SHADE
AND A LIME-FREE SOIL

provide the ideal conditions for these fine flowering shrubs; they will do equally well in an open position, given a cool, moist root run.

Azalea pontica. Honeysuckle-scented, yellow flowers ... ... 5/- each

Andromeda taiwanensis. Brilliant spring foliage; racemes of white summer flowers; evergreen ... ... 7/6 each

Erica arborea. Beautiful tree heath with fragrant white flowers March-April ... 4/6 each

Azalea mollis. Mixed seedlings; may be pink, orange, flame shades ... ... 5/- each

Enkianthus campanulatus. Bell-like spring flowers; magnificent autumn foliage 5/6 each

Kalmia latifolia. Fine evergreen with clusters of pink flowers in June. A splendid shrub. 7/6 each

Full collection 35/-, carriage and packing free for cash with order. Orders under 35/- please add 3/-.

Please quote RHS/1 when ordering.

We shall be pleased to send catalogues on request.

STEWARTS NURSERIES
FERNDOWN *Est. 1742* **DORSET**

THE

Chiltern Tree Surgeons

•

Specialists in the preservation of mature and ornamental trees. Lopping and felling of dangerous trees.

•

27 QUEEN COURT

QUEEN SQUARE, W.C.1

TERMINUS 8394

Dobbie's SEEDS

for RELIABILITY

For details write for our SEED & PLANT CATALOGUE Sent on receipt of 2½d stamp

DOBBIE & CO · LTD

Nurserymen and Seedsmen, EDINBURGH · 7

THE

SOUTHERN TREE SURGERY COMPANY

Arborists and Tree Surgeons

12, Garden Road, Walton-on-Thames, Surrey. (Tel. 3845)

79, Tower Street, Winchester, Hants. (Tel. 3972)

We advise on, estimate for, and carry out all tree work from planting to felling, specializing in TREE SURGERY—the treatment of amenity trees for their safety, preservation and beautification. Cabling, cavity filling, treatment of wounds, disease control, pruning, lightening, topping and shaping DANGEROUS TREES or felling as necessary, etc. Tree wound paint, fertillizers, fungicides, insecticides, etc. supplied. We also act in an advisory capacity, full reports for Public Liability, Insurances, safety and preservation in Parks, Schools, Estates, and Gardens. Treescape of gardens carefully studied.

On Admiralty, Ministry of Works, National Trusts, etc., Lists

This company, the original of its name, recently took over the work of the late English Tree Expert Co. Ltd., of Shepperton, and wishes to stress that neither company has any connection with any firm now similarizing the name of the present company.

The labour saving machine for spraying vegetables or fruit—" LEO-COLIBRI " Pneumatic (Pressure Retaining) Sprayer.

SPRAYING MACHINERY

For applying Washes, Dusts, Weed-killers, Creosote, Disinfectants and Limewash.

Catalogue from:—

COOPER, PEGLER & CO. LTD.,

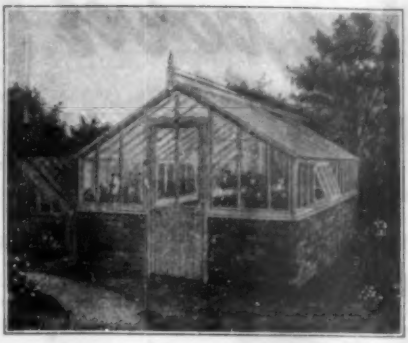
P.O. Box No. 9-67,

BURGESS HILL, SUSSEX

C. H. WHITEHOUSE, LTD.

'Phone: FRANT 247

Buckhurst Works, FRANT, Sussex



GREENHOUSES FOR ALL PURPOSES

Commercial Glasshouses,
Alpine Houses,
Orchid Houses,
Carnation Houses,
General Purpose Houses,
Garden Frames, etc.

Constructed of Imported Hardwood of selected species.

Painting Unnecessary - Low in Upkeep Costs

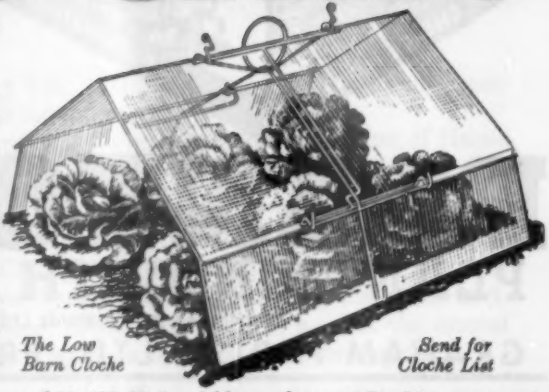
New Fully Illustrated Catalogue Free on Application

Chase CLOCHES

The World's Best

For
Protecting against frost
Reducing weather risks
Speeding crops by weeks
Minimising labour costs
Increasing crop output
Quickly repaying outlay
Lightness with portability
Steadfastness in storms
Service for a lifetime

EASY PAYMENTS



The Low Barn Cloche

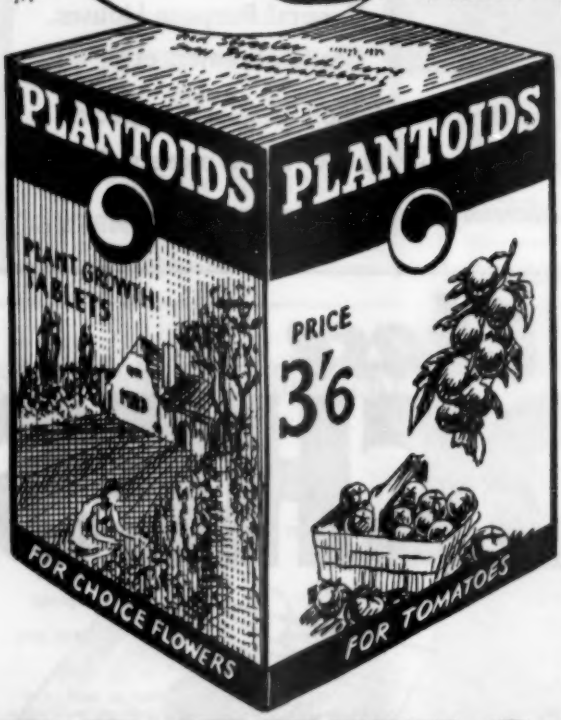
Send for Cloche List

Pack of 8 Low Barns, £3.12.6. Case of 30, £12.15.0. Address of nearest Stockist on request.

CHASE PROTECTED CULTIVATION LTD., 38 CLOCHE HOUSE, SHEPPERTON, MIDDX.

"Plantoids do plants a power of good"

says **FRED STREETER** V.M.H.



"I've tested them on numerous vegetable and flower plants with excellent results and can heartily recommend them."

3'6
A PACKET
OF OVER
300

Of dealers everywhere

ANALYSIS :—

Nitrogen	9%
Potash (K_2O)	9%
Phosphoric Acid (P_2O_5 Insol.)	12%

PLUS

Manganese, Iron, Calcium and Naphthaline.

PLANTOIDS REGD.

PLANT GROWTH TABLETS

Distributed for Plantoids Ltd. by

GRAHAM FARISH LTD, BROMLEY, KENT

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

VOL. LXXIX PART ONE

January 1954

THE SECRETARY'S PAGE

ANNOUNCEMENTS—JANUARY AND FEBRUARY

Shows

TUESDAY, January 19 12 NOON to 6 P.M. WEDNESDAY, January 20 10 A.M. to 5 P.M.	Fortnightly Show.
TUESDAY, February 2 12 NOON to 6 P.M. WEDNESDAY, February 3 10 A.M. to 5 P.M.	Fortnightly Show.
TUESDAY, February 16 12 NOON to 6 P.M. WEDNESDAY, February 17 10 A.M. to 5 P.M.	Fortnightly Show. Annual General Meeting at 3 P.M. on February 16.

Lectures

TUESDAY, January 19, at 3 P.M. "Horticultural Education and Training" by MR. D. SKILBECK, M.A.

TUESDAY, February 2, at 3 P.M. "The Selection and Culture of House Plants" by MR. C. R. BOUTARD.

Annual General Meeting—The Annual General Meeting to receive the Report of the Council for 1953 and a statement of accounts for that year will be held on Tuesday, February 16, at 3 P.M. The HON. DAVID BOWES-LYON, President of the Society, will present the annual awards. There will also be a show on that and the following day.

Examinations in 1954—Candidates wishing to enter for the Society's Examinations in Horticulture in 1954 are reminded that the closing dates for entry forms are as follows:—

General Examination in Horticulture, and General Examination in Horticulture for Juniors—Monday, January 11, 1954.

National Diploma in Horticulture—Intermediate and Final Examinations, and N.D.H. Honours—February 1, 1954.

Teachers' Diploma in School Gardening—Intermediate and Final Examinations, February 1, 1954.

Cruise to Famous Gardens, 1954—Induced by the great popularity of last year's Gardens Cruise, the Gardens Committee of the National Trust for Scotland has again chartered the T.S.S. *Lady Killarney* from Coast Lines Ltd. Instantly the cruise, arranged to take place from May 12 to 19, 1954, was fully booked, except for a few berths still reserved for overseas visitors.

To avoid disappointment to the many on the waiting list and others who have yet to send in their applications the Committee has decided to run a second cruise to Scottish gardens. The *Lady Killarney* will leave Ardrossan on May 5 to visit Glenarn, Benmore, Arduaine, Iona, Colonsay and Brodick, and return to Ardrossan on May 11.

Immediate application for this cruise is strongly advised. Application forms and particulars may be obtained from the Organizing Secretary, Gardens Cruise, The National Trust for Scotland, 5 Charlotte Square, Edinburgh 2.

International Flower Show "Fiore E Giardino" at Milan—To celebrate the centenary in 1954 of the Lombardy Horticultural Society, an International Flower Show will be held in Milan's largest park, from the end of August to November 10, 1954.

Exhibits are invited from this country and full details may be obtained from Mr. H. R. Cocker, Villa Taranto, Pallanza, Lago Maggiore, Italy.

Journal and Botanical Magazine Binding—Arrangements have now been made for those Fellows who so wish to have the JOURNAL bound in green cloth, with or without Proceedings, with the lettering and crest in gold. The cost for each volume of 12 parts will be 9*s.* 6*d.* plus 1*s.* 6*d.* for return postage and packing. Fellows may also have the *Botanical Magazine* bound in dark blue buckram with gold lettering. The cost for each volume will be 13*s.* 6*d.* plus 1*s.* 6*d.* for return postage and packing. Parts for binding should be sent, with remittance, to Messrs. Mansell (Bookbinders) Ltd., 41, Britannia Row, Essex Road, London, N.1. The parts should *not* be sent to the Offices of the Society. Inquiries for binding in special styles should also be addressed direct to Messrs. Mansell.

NOTES FROM WISLEY

CONTINUING the observations made last month on plants suitable for greenhouse cultivation consideration is given in this note to some of the genera and species to be seen in the Temperate House. Fellows frequently ask the meaning of the terms temperate, stove, cool and cold as applied to the different types of greenhouses. In defining these terms it is usual to state the temperature at which it is aimed to keep the greenhouse with the aid of pipe heat, remembering of course that the temperature of the greenhouse is at certain seasons increased by the effect of the sun. Thus a stove house is maintained at 65° F., a temperate house at 50°–55° F. and a cool house at 40° F. A cold house is one which lacks artificial heating and thus very little control of the temperature can be obtained other than by early closing of the ventilators to "bottle up" the sun's heat. At Wisley it is possible to see plants growing under all these conditions. The cold houses are situated away from the main greenhouse range on Weather Hill and are designed to demonstrate to Fellows suitable cropping programmes for a small house for the amateur. The Alpine House is also without heating and could thus be termed a cold house.

The Temperate House originally was designed to house the Society's large collection of Figs which came to Wisley from the old gardens at Chiswick. However, these Figs were removed in the early 1930's and replaced by collections of ornamental plants, the more shrubby members being placed in the centre bed with pot plants arranged on the surrounding staging and climbers growing up the roof overhanging the staging.

One of the most conspicuous plants we notice on first entering the house is *Tibouchina semidecandra*. A native of Southern Brazil it makes strong annual growths which soon reach the roof and are covered with bright rich purple flowers 3–5 inches across. *Tibouchina* belongs to the family Melastomaceae as does the Mexican *Schizocentron elegans* which, however, has a creeping habit forming a dense mat of stems that root at the nodes. The deep purple flowers are about 1 inch across and are carried on slender peduncles ¾ inch long.

Of the family Leguminosae the most notable genus in this house is the genus Acacia whose members provide some of the most beautiful plants for greenhouse cultivation. Although the colour of the flower varies but little there is a great range in habit and in leaf shape and many have a charming fragrance and great floriferousness. Near to the southern entrance of the house is the pinnate-leaved *A. Drummondii*, a native of the Swan River of Western Australia. Towards the other end of the house is *A. verticillata* with leaves, or more correctly phyllodes, in whorls of six, and which comes from both Australia and Tasmania. *A. crassiuscula*, sometimes called *A. adunca*, has the same general geographical distribution and linear phyllodes. The largest plant is that of *A. Baileyana*, the Cootamunda Wattle, a most beautiful

cool greenhouse shrub whose flowers open early in the New Year. In the warmest parts of Cornwall it is hardy. At Wisley, in the Temperate House, it forms an umbrella which provides shade for the plants growing beneath. Close by is another member of the Leguminosae, the Tropical American *Cassia corymbosa* with rather cup-shaped rich yellow flowers carried in axillary or terminal clusters. The flowers have their main flush in August, but there are not many times of the year when it is not possible to find an odd flower on this 5–6 foot shrub. Two more legumes to note are *Genista monosperma*, from Southern Spain, Portugal and North Africa, which opens its white scented corollas in early spring, and *Hardenbergia violacea*, sometimes called *H. monophylla*, which is also spring flowering. This evergreen Australian twiner has violet flowers yellow spotted at the base and carried on stems which twine up the roof.

Of the family Proteaceae we observe *Grevillea rosmarinifolia* which hails from New South Wales and which has red flowers carried in terminal clusters. It is interesting to note in this, the 150th year of the Society's history, that the generic name *Grevillea* was coined in honour of CHARLES F. GREVILLE, a founder of The Royal Horticultural Society, who lived from 1749 to 1809. Also of this family and of the same country is *Hakea acicularis* with needle-like leaves and white or pinkish flowers borne on silky stalks.

There are several monocotyledonous perennials in the house and one of the most striking is *Strelitzia Reginae*. This is commonly known under the names of either The Bird of Paradise Flower or The Bird's Tongue Flower and is a member of the Banana family, Musaceae. It has highly ornamental foliage and lovely orange, blue-tongued flowers borne in rigid purplish boat-like bracts and on stems some 3–5 feet high in late winter and early spring. Of the Zingiberaceae, the Ginger family, there is the genus *Hedychium* represented at Wisley by the Western Bhutanese *H. Greenei* with tubular scarlet corollas up to 2 inches long. The white Arum Lily, or the Lily of the Nile or the Calla Lily as it is variously known, is famed for its use in decorating churches at the great festivals of Christmas and Easter. The botanical name is *Zantedeschia aethiopica*. There is also to be seen at Wisley *Z. Rehmannii* which is dwarfer growing than *Z. aethiopica* and has spathes of rose pink. It is interesting to note that not one mile from Wisley there are to be found growing in a private garden bordering the River Wey clumps of Arum Lilies which have survived out of doors for many years without protection of any sort.

Of the Lily family *Chlorophytum elatum variegatum* has come into prominence in recent years as a plant suitable for house decoration. It has leaves up to 24 inches long, bright green and striped with longitudinal lines. Of bulbous plants the species of *Lachenalia* have given hybrids which in February and March brighten the side staging of the Temperate House with yellow and green flowers. They are known under such names as *aloides* var. *aurea* 'Burnham Gold,' 'Greenfinch

hybrids' and 'Whitewell hybrids.' In the family Iridaceae there are many cormous plants such as *Freesia*, *Ixia*, *Sparaxis* and *Tritonia* all of which flower at much the same time as *Lachenalia* and all of which are natives of South Africa. It should be noted that these bulbs and corms all benefit by being well dried off after the foliage has died down. At Wisley when flowering has finished the pans and pots are removed to frames where the summer sun is allowed to beat on the soil thus ensuring that the bulbs and corms are thoroughly ripened. In September they are removed from the old soil and repotted and the pans placed in a warm house. They are watered only sparingly until they start to grow when water can be given more freely. The taller growing plants such as Freesias should be supported by small twigs.

Of climbing plants we notice *Macleania insignis* which has, in June and July, rich scarlet corollas 1½ inch long, borne in clusters of up to four in the leaf axils. In its native home of Mexico this plant is found growing epiphytically on oaks. Perhaps the most sweetly scented plant in the house is *Jasminum polyanthum*. It was discovered in Yunnan by the French missionary PÈRE DELAVAY in 1883 at altitudes of between 1,300–2,200 metres—too low an elevation for complete hardiness in most parts of the British Isles. At Wisley it can be grown only in a house, where unfortunately it does not have the outer surface of the corolla coloured so deep a pink as when grown out of doors. It is reported to flourish against warm walls near the south coast.

Of the Passion Flower, *Passiflora*, we note one species *P. ligularis* and one first cross *P.* × *alato-caerulea*. The former, a Peruvian plant, has the corona white striped with purple bars and the latter the corona of white and blue-purple. The name Passion Flower by which all members of this genus are known was given originally by the Spanish priests who discovered the flower in South America. Their piety led them to detect a resemblance between the various parts of the flower and the instruments of Christ's Passion; the three stigmas representing the three nails, two for the hands and one for the feet; the five anthers the five wounds; the corona the crown of thorns or the halo of glory; the five petals and the five sepals the ten apostles—Peter and Judas being absent; and the hand-like leaves and whip-like tendrils the hands and scourges of His persecutors. The species *P. edulis* is the one commonly grown for its edible fruits in the warmer parts of the world and on sheltered walls in the more favoured districts in the British Isles.

Lapageria rosea is another choice climbing plant. It has bell-shaped flowers, some 2 inches across, which are rosy-crimson spotted with rose. There are also white and intermediate colours obtained by crossing the white and red forms. *Streptosolen Jamesonii* is found at Wisley both trained as a climber and growing as a pot plant. The yellowish pink buds open to orange-red flowers which are profusely borne in June and July, but may be seen in small quantities for most of the year.

Hibbertia volubilis also shows rich yellow flowers over a long period

with the main flush in the summer, while *H. dentata* opens its bright yellow flowers earlier in the year. Both these plants are evergreen glimbers and the flowers unfortunately tend to be produced close to the class and to be hidden by the foliage. The Blue Dawn Flower of Tropical America, *Ipomoea Learii*, also called *Pharbitis Learii*, is wonderfully floriferous, but unfortunately the intense blue of the flowers turns with age to magenta.

In summer the trumpet-shaped white pink-tinged flowers of *Pandorea jasminoides*, or *Bignonia* or *Tecoma jasminoides* as it is sometimes still called, the Bower Plant of Australia, can be seen, whilst from January to May *Buddleia madagascariensis* shows a wealth of orange-yellow blossom in panicles of 6 or more inches long. The Australian *Hoya carnosa* is most appropriately named the Wax Flower, in fact the pinkish-white corollas, in pendant umbels, are so waxy in appearance that they appear almost artificial. The species is similar to the Indian *H. bella* which can be seen in the Stove House.

Other items which may be noted are the collection of cacti and succulents, the Regal Pelargoniums in which interest suddenly has been revived, the South African Ericas and the Rhododendrons and Camellias which are planted in the centre bed. The last three genera have all been mentioned briefly in previous notes.

PERPETUAL FLOWERING CARNATIONS

Montagu C. Allwood, F.L.S., V.M.H.

(*A Lecture given to Fellows of the R.H.S. and members of The British National Carnation Society on Nov.* 3, 1953; J. L. RUSSELL, ESQ., *in the Chair*)

THE joy of a garden is that one can indulge in its pleasures during any day or season of the year, in any kind of weather. The Perpetual Flowering Carnation, growing in a cold or cool greenhouse, is the one plant which gives endless interest as it grows and flowers throughout the year. Also it is the greatest cut flower if you take the flower markets of the world. DEAN SWIFT said "Whoever could make two ears of corn or two blades of grass to grow . . . where only one grew before, would deserve better of mankind . . . than the whole race of politicians put together." This quotation is most applicable to the Perpetual Flowering Carnation because it produces 100 per cent. more flower than ever grew before with the old Border Carnation.

The evolution of the Perpetual Flowering Carnation is undoubtedly the greatest achievement in modern horticulture, and this development has taken place within the lifetime of some of us. The Perpetual Flowering Carnation was evolved from a race of plants which used to

lie dormant for a third of the year. It has now been developed into a plant which grows and flowers all the year round with a greater range of colours and combination of colours than is found in any other race of plants. This development is so wonderful that few people fully appreciate it, or realize that this wonder race of Carnations has become "The Carnation" practically all over the world. In some continents like Africa it has almost naturalized itself. It may be ridiculous to talk of a man-made plant, yet the development of the modern Carnation is particularly fitted to meet the needs and conditions of modern life in this new world of ours.

ORIGIN

France has been credited with its origin and America with its early development, but I now believe that in spite of the competition from other countries particularly U.S.A., Holland and Denmark, this country is recognised as being supreme. However that may be, undoubtedly the best new kinds originate here and for this happy result our wonderful climate, which thoughtless people condemn, is to a large extent responsible together with our own methods of cultivation.

PARENTS — TWO DISTINCT TYPES

The ancestors of the Perpetual Flowering Carnation are self evident to all of us whose main occupation in life is the raising of new and improved kinds. Even in our seedlings to-day, there are two distinct types: one group shows a strong trace of the Marguerite or annual Carnation and the other of the old English Border Carnation, so if you go back to the parents of these two distinct races of Carnations, you can see how the blending of the two types evolved our wonder plant. But mark this, it is only by man working in conjunction with Nature that the race can be developed or even sustained.

CULTIVATION

With a hybrid race of plants like the Perpetual Flowering Carnation, which is distinct from all other plants because it has no resting or dormant period, care must be taken in cultivation. If you allow your plants to become checked and weakened through neglect then they have not the opportunity to recuperate. This to my mind is the only essential to be remembered for the successful growing of Perpetual Flowering Carnations. They should be kept growing slowly and strongly during their entire lives; also steps should be taken to prevent the extremes of being cooked in the summer and frozen during the winter. Much of this cultural information you can gather better from a book upon the subject than you can by listening to me, but you will notice that I have not mentioned the name of an author of any Carnation book. To grow Carnations successfully you simply require common sense, or rather you should treat them just as you would enjoy being treated yourself. The essentials for the successful cultivation of

Perpetual Flowering Carnations under glass in this country with its variable climate are:—

(i) A good direct light in the greenhouse in winter yet in summer a slight shade is enjoyed, and
(ii) free ventilation or free circulation of air around the plants at all times to keep them healthy; but like ourselves they resent a draught.

In these conditions our climate will produce better results than any other. A Carnation hates extremes of any kind, excessive heat in the summer or intense cold in winter, extreme dryness at the roots or again waterlogged soil, and so one could go on making observations about opposites and the reason why the plants prosper so well in this country is because ours is such a wonderful climate and free from excessive extremes. King Charles II described ours as the best climate because "you could go out-of-doors any day of the year."

SOILS

In the cultivation of Carnations we hear far too much about the difficulties, which I contend do not exist except in the minds of incapable gardeners. Soil for instance can quite successfully and easily be made suitable. Some people, for example, grow good Carnations in sand and gravel alone, by feeding them artificially; so that is proof that you can make your soil suitable.

I have said and written many times that the natural homes of all the wild ancestors of the Carnations and Pinks are the limestone mountains of Europe, so from this information you can infer the plants' simple requirements in all matters, especially the kind of soil they prefer. Think for a moment, what kind of soil and conditions you would find for example on Cheddar Gorge. The soil would be sweet, with some lime, good drainage and so on.

CARNATION GREENHOUSE

The joy of a greenhouse and especially one devoted to Carnations is that it can provide pleasant occupation every day of the year. You are independent of the weather and this kind of work is light and most interesting. In fact, I rather hate going away for a holiday, because I have things of greater beauty and interest about me at home. The essentials of a greenhouse for Perpetual Flowering Carnations are direct sunlight and a free circulation of air but so regulated that it reaches the plants without a draught. If you want to have winter blooms a little artificial heat is necessary to keep out the frost, but of course you can grow Perpetual Flowering Carnations quite well in a cold greenhouse, but the frost will retard their flowering. Moreover with the improved modern economical methods of heating it is wise to have a little artificial heat in the cold weather. There is an unwritten law of life, that you only get what you work for. We gardeners know

full well that our gardens would not produce much if we did not work upon them, and so it is with the Perpetual Flowering Carnations. They enjoy a little attention in your greenhouse, such as occasionally cultivating the surface of the soil in the pots, or spraying in summer to avoid any pests or diseases, training the plants inside the plant supports, disbudding and so on, all of which is a pleasant occupation.

WATERING

The art of gardening under glass centres mainly upon the watering of the plants. It should be a subject for study because the plants cannot refuse what you give them. The amount of water they require varies according to the weather and the season of the year, but there is another factor in watering plants under glass. No one can specifically tell another how to do it; you learn the inner secret of watering by observation. There is one definite rule: if a plant is dry at the root, thoroughly water it; if it is not dry leave it alone. It is the happy medium between the two extremes of moisture in the soil which keeps the roots and the plant healthy, because just like ourselves they should occasionally be allowed to become hungry and thirsty in order to keep them fit.

PERPETUAL FLOWERING CARNATIONS FROM SEED

Some people imagine that you have to be a multi-millionaire to grow Perpetual Flowering Carnations, but you can make quite a reasonable start with a five-shilling packet of seeds. There are in fact few, if any, specialized plants that you can begin to grow in so moderate a manner.

I have one complaint against the Perpetual Flowering Carnation and that is that you get too good a value from a five-shilling packet of seed. You get a good variety of colour and it is quite rare for a single-flowered seedling to be produced; that is proof of the high state of development of the plant, because its wild ancestors were single-flowered Dianthus which only flowered during one month each year. You can sow the seed during any month of the year, but for this country personally I think the early months are the *best* and the late autumn the worst. It is quite simple to raise the seedlings, so long as you remember that the seed is like a miniature shell; it can be very easily cracked or killed. Also, use light sandy soil and barely cover the seed with soil—if it is deeply covered, it will not germinate. Keep it dark until germination takes place in a matter of ten days; then the best place is a sunny shelf in a greenhouse. A little artificial heat does help during the dull, cold season; some people utilize the warmth of a kitchen to germinate their Carnation seed.

I never stop my Perpetual Flowering Carnation seedlings but allow them to elongate to flower, growing them in 5-inch flower pots which do not take up too much room so that I can discard the useless seedlings, but the selected ones have their flowers cut in the usual way and are potted on into 8-inch or 10-inch flower pots. It is very surprising the quantities of flower you can cut from them, and for how long they

will continue to produce blooms. In fact, it seems foolish for anyone to grow any other plants in a greenhouse than Perpetual Flowering Carnations.

PROPAGATION

Propagation is a word which positively frightens some people, they think there is a mystery about it. The whole secret of success is to have the parent plant in a healthy growing state and then to propagate from it at the best season. All this information you can more easily gather from a book than from a spoken lecture. Cuttings of Perpetual Flowering Carnations growing in a mildly heated greenhouse are best rooted in January; those from 'Amateur' or Cold Greenhouse Carnations in March or September, but many amateurs prefer to propagate their stock by layering, which is best carried out in July.

It is difficult to describe by words alone precisely how to take a cutting but pictures will show you, more clearly than anything I can say, while a book with illustrations is even better still. However, there are definite rules in propagating Carnations which must be observed. The cutting must be taken with a sharp knife just below the joint or leaf axis. The best rooting medium is Vermiculite or sharp river sand; builder's sand or silver sand are not nearly so good. No cutting or layer must be allowed to become dry in the process of rooting. Also, you will naturally shade your cuttings from the strong sun, but of course they must have a good light to keep them healthy.

EVER CHANGING

Nothing in the world of Nature remains stationary; there is a constant change taking place; and so with a hybrid race of plants such as the Perpetual Flowering Carnations, unless a continual effort to find new and better varieties is made retrogression would take place. That factor alone would justify the existence of The Royal Horticultural Society and also The British National Carnation Society whose duty it is to guide and encourage the plants' development and to protect the general public against the introduction of inferior kinds as novelties by unscrupulous people. Those who belong to any Horticultural Society are encouraging good gardening, and always remember this: it is the duty of our generation to pass on to the next the knowledge it has gained by practical experience. It is very questionable whether we of to-day are as capable horticulturally as our ancestors were. We have many advantages to-day in plant foods and machinery for good cultivation. Yet with all these advantages are we better gardeners?

'AMATEUR' CARNATIONS

Now I will just say a few words about what we call the 'Amateur' Carnation. The crossing of the Perpetual Flowering Carnation on to the modern Hardy Border Carnation has produced this rather distinct type of plant with a short bushy habit of growth, ideal for small greenhouses. They are hardier in constitution than the ordinary Perpetual

Flowering Carnation varieties and so are ideal for the cold greenhouse, or they make a suitable race of plants for the Garden. In fact, the British National Carnation Society held some Trials at Shenley to test their hardiness out of doors. They were not judged until the second year and it was surprising how resistant to the elements they proved to be in the open, and how well they flowered away during the spring, summer and autumn. I hope some day the R.H.S. will hold some official trials at Wisley, because while certain kinds of Carnations are bred for the market cut-flower grower, others, such as the Royal type are for those who want giant flowers and the growth of both these types is usually tall. The amateur in his small greenhouse wants a suitable plant that is hardy with a short bushy habit; these to my mind are always presentable and attractive in appearance.

"DR. CARNATION"

A plant which you can grow in a greenhouse, where you can garden every day of the year under ideal conditions, supplies an endless amount of interest and mental refreshment and is of great moral and medical benefit to most people. "Dr. Carnation" is a great physician, but to get the full benefit from his tonics you must work for it. That is the joy of gardening—doing something; then you get that restful feeling, the triumph of achievement, the most satisfying state of all.

Some people write books upon this subject of the growing of Perpetual Flowering Carnations. One man I know has written a book of some 400 pages. Some even call this book "The Carnation Bible" and take it with them wherever they go because they say that the very thought of Carnations gives them that peace of mind and mental repose of which this modern mechanical word is so much in need. Our ancestors lived their lives in natural surroundings; to-day all too many people are surrounded by man-made goods and noises.

FOOD FOR CARNATIONS

A plant, which is perpetually growing during the four seasons of the year, naturally must have a special food because as soon as it becomes weak it has no dormant period during which it can recuperate and so regain its strength. Therefore a highly concentrated quick-acting fertilizer will force an artificial, weak growth. My contention all my gardening life has been that all Carnations, and especially the Perpetual Flowering type must have a slow-acting organic food, one in which the food is gradually broken down and made available to the plant by the elements. Someone is sure to ask me, "What do you mean by an organic food?" So I will say now, one which has the essential foods supplied by once living organism as dried blood, bone flour, wood ashes, ground fish meal and so on. These feed the plant slowly in Nature's way.

All Perpetual Flowering Carnations require the bulk of artificial feeding in spring, summer and early autumn, but naturally the plant

must not be allowed to suffer from starvation during the rest of the year. Why it is more difficult to feed artificially a plant than an animal is this: An animal can move about and refuse the food you give it; but not so a Carnation plant, it has to take the food given to its roots for better or for worse, so that you require a certain amount of knowledge and judgment as to when, what and how you give this artificial assistance. That is why gardening is so interesting. You cannot learn all about it in your books or lectures, you must experiment yourself.

THE INFLUENCE OF PERPETUAL FLOWERING CARNATIONS

Have you ever thought about the great influence that the Perpetual Flowering Carnation has upon other members of the Dianthus family.?

First, by crossing them on to the Garden Pink, the Perpetual Flowering Pink *Dianthus Allwoodii* was developed. This plant revolutionized the Pink World in all its various types. It also made the Perpetual Flowering Alpine Dianthus in double and single flowers with a dwarf habit and a great variety in colours. The Sweet William it made into a Perpetual Growing and Flowering plant called 'Sweet Wivelsfield' which is grown everywhere in the New World. This in turn helped to develop the wonderful spidery mist-like form of the fragrant Dianthus 'Loveliness' which adds to the attractions of any garden. None of these would have come into existence without the influence of the Perpetual Flowering Carnation.

THE NEW CODE FOR THE NAMING OF CULTIVATED PLANTS

J. S. L. Gilmour

Chairman of the International Committee on Horticultural Nomenclature and Registration

ANYONE who deals in any way with cultivated plants uses plant names. This glimpse of the obvious ought to mean that the appearance of a new Code for the naming of cultivated plants should be a memorable event for all gardeners. I say "ought to mean" advisedly, because there is no doubt that, in the past, Codes of Nomenclature have made little appeal to gardeners, the great majority of whom have been blissfully unaware of their existence. As a consequence, many horticulturists—on hearing of "a new Code"—will, no doubt, raise a respectful (or contemptuous) eyebrow and get on with reading their latest catalogue. The aim of this article is to persuade readers of the Society's JOURNAL, not only that this attitude is against their own interests, but that a good deal of quiet entertainment can be extracted from trying to use plant names correctly—if only the entertainment of putting their neighbour right!

It is true that, hitherto, there has been ample excuse for ignorance. Although Codes for the naming of cultivated plants have existed, in some shape or form, for nearly 100 years, they have been printed in obscure publications, quite inaccessible to ordinary mortals. This excuse no longer holds. The full text, plus a summary, of the new Code can be purchased for one shilling and three pence (post free) from the Society, and, in addition, reference to it has been made in many horticultural and other periodicals. What, then, is the new Code about, how does it affect gardeners, and what should they do about it ?

In the first place it is *not* about the Latin names of wild species or varieties—names like *Rhododendron ponticum* and *Aesculus octandra* var. *vestita*. Whether wild plants are grown in gardens or not, their Latin names are governed by quite a separate Code, devised by botanists for the purpose. It is true, of course, that gardeners have to use Latin names for many of the wild plants that they grow, and equally true, unfortunately, that the frequent changes in these names are a source of annoyance to everyone; but that is quite another story, with which we are not concerned here. At the last International Horticultural Congress steps were taken which we all hope will result, with the co-operation of botanists, in the stabilization of widely used Latin names of cultivated plants.

No, the new Code deals, not with wild species, varieties and hybrids, but with what are commonly called "garden varieties"—namely, forms which have been brought into existence by selection, hybridization, or other similar processes devised by man, and are maintained in cultivation as clones or pure lines by man's care and skill—such plants as Rose 'Peace,' Apple 'Beauty of Bath,' and thousands of others. The distinction between "wild" plants and "garden varieties" is not absolutely clear cut, and in the Code a closer definition is attempted—but for our present purpose the difference is obvious enough.

In the Code, it is recommended that "garden varieties" should technically be called "cultivars." This has been their official name for many years and it is clearly desirable, if the two categories of "wild" and "cultivated" varieties are to be recognized, to have a short and internationally current word for each of them. "Variety" and "cultivar" serve this purpose admirably, but it is not to be expected that all gardeners will make the distinction and adopt the word "cultivar" in ordinary parlance, at any rate immediately. Personally, however, I hope and believe that eventually "cultivar" will find favour. It is a clear and easily understood word and will, I think, prove useful to those gardeners who care for accuracy and precision in their craft, and especially to those who have dealings with fellow-gardeners in other countries.

The Code, then, deals with the *names of cultivars*. It may be helpful, I think, to consider its rules and regulations under three headings: firstly, those of interest to all gardeners who have occasion to write the names of cultivars; secondly, those which are concerned with the coining of new names; and thirdly, those more technical provisions

which are of interest primarily to horticulturists studying a particular group and trying to establish what are the correct names for its cultivars.

1. THE WRITING OF CULTIVAR-NAMES

The most important point, perhaps, concerning the names of cultivars is that they should not be in Latin, but in any modern language using the so-called Roman alphabet (*i.e.* the alphabet in which English, French, German, etc., are written). The reason for this is, of course, to distinguish, at a glance, names of cultivars from names of wild varieties, which are in Latin. In the future, Latin names for cultivars will definitely not be allowed by the Code, but we are faced with the *fait accompli* of hundreds of existing Latin names which have been widely used for many years. For example: the dwarf conifers abound with cultivars called 'nana,' 'prostrata,' 'compacta' and the like, and such names as 'albus,' 'variegatus,' and 'plenus' occur in almost every cultivated genus. It would clearly be foolish to try to alter all these, and the Code accepts such legacies from the past as permanently with us. (As we shall see, however, a distinction is made between the *writing* of Latin cultivar-names and Latin varietal-names.)

The vast majority, then, of cultivar-names are vernacular or "fancy" names like 'Winston Churchill.' How should the full name of a cultivar be written? The complete and technically correct form, including the Latin name of the species from which the cultivar has been derived, is illustrated in the following example: *Sedum spectabile* Boreau, cv. 'Brilliant,' but I hasten to add that this lengthy designation is for use only on full-dress occasions! In the example, *Sedum* is the name of the genus, *spectabile* the name of the species (technically called the "specific epithet"), Boreau the name of the man who first described the species under that name (technically called "the authority" for the name), cv. the abbreviation of cultivar, and 'Brilliant' the cultivar-name for the particular cultivar concerned. It should be noted (1) that the generic name and specific epithet are printed in italics, (2) that the cultivar-name begins with a capital letter, is printed in ordinary Roman type, and is enclosed in *single* quotation marks, and (3) that there is no "authority" after the cultivar-name. These three points are important, and apply to the writing of all names of cultivars. If we wish to cut down this rather formidable string of words for every-day use, the authority can be omitted in all except very technical writing. Secondly, the abbreviation cv. can normally be left out, as the vernacular form, single quotes, and Roman type of 'Brilliant' indicate quite clearly that it is a cultivar-name, and not the name of a wild variety. In this shortened form, therefore, the name would read simply:

Sedum spectabile 'Brilliant'

and this is the normal method of writing the names of cultivars.

There are, however, two additional refinements that should be mentioned—apart from the special case of cultivars derived from

hybrids, which I will deal with later. The first concerns those Latin cultivar-names which are left over from the past. These should be printed in Roman type and enclosed in single quotes to distinguish them from Latin varietal names; thus one would write *Thuja orientalis* 'elegantissima,' where 'elegantissima' is a cultivar-name, but *Aesculus octandra* var. *vestita*, where *vestita* is the name of a wild variety.

The second point refers to the omission of any authority after a cultivar-name. Many cultivars are first described in reports of trials, in catalogues, and other anonymous publications; this makes the quoting of an authority impractical, but there is provision in the Code for writing the raiser's or introducer's name in brackets after the cultivar-name if so desired, thus: *Weigela* 'Avalanche' (Lemoine).

2. NAMING NEW CULTIVARS

General

Let us suppose that a nurseryman, park superintendent, or amateur gardener has just flowered a batch of seedlings of, say, *Helenium*, and that he spots one as being of a new type and worthy of propagation. In due course he shows the plant at a fortnightly show, under a number, and an Award of Merit is given to it. He must now find a cultivar-name for his new plant. His first problem, of course, is to choose a name that has not been used before in the genus *Helenium*. If he picks on a very unusual personal name he can be fairly certain that he is the first to use it. If, however, he prefers a more general name, like 'Innocence' or 'Venus,' there is a danger that it has been used before. If there existed a registration authority for *Helenium* names, as there does, for example, for names of Daffodils, he could, of course, consult this authority, but in its absence he must do his best to comb the likely literature—for example the Index to this JOURNAL, nurserymen's catalogues, etc.—and to assure himself that his chosen name has not already been used. His next step is to make certain that the name is in accordance with the best practice for coining such names. Here is where the Code will help him. In it he will find (under Section F) a series of rules for his guidance, based on the accumulated experience of horticulturists of many nations. I will not repeat these rules here—they can be read in the Code—but perhaps the most important, apart from the rule already quoted that the name must not be in Latin, is that it should be short (not more than two words), should avoid forms of address liable to be confused (*e.g.* Mr., Mrs. and Miss) and, as far as possible, should be easily pronounceable by all nationalities. As the Code says, 'Centenaire de Rozain-Bourcharlat,' 'Diplomagartenbauinspektor,' and 'Eldwyth Cholmondeley' are not looked upon with favour as cultivar-names! Having chosen a name, it is essential to ensure that it is published, together with an adequate description, since the Code does not recognize names that are not published, or are published with no description. The Code lays down what is meant by publication, and

by adequate description. The names of plants which receive an Award at Vincent Square are automatically published, with a description, in this JOURNAL, but for other methods of publication the Code should be consulted.

Hybrids

The naming of cultivars derived from crosses between two or more different species, belonging to the same or different genera, involves rather special problems. By "derived from" I mean not only the *first* generation from a species cross, but all subsequent generations and back-crosses with the original parents or with members of the first or later generations. Any cultivar which is the progeny of a species cross, however remote, comes, for the purpose of the Code, under the heading of a hybrid and its naming is subject to definite rules. The full name of a "hybrid cultivar" must be regarded as consisting of three distinct parts: (1) the name of the genus (or "hybrid genus" if a hybrid between two or more genera is concerned); (2) a "collective" name or phrase covering *all* the progeny resulting from the particular species-cross concerned; and (3) a cultivar-name for the particular form (cultivar) under consideration. In the name *Viburnum* × *bodnantense* 'Dawn,' *Viburnum* is the generic name, ×*bodnantense* is the collective name for all progeny of the cross *V. fragrans* × *V. grandiflorum*, and 'Dawn' is the cultivar-name for a particular seedling of this parentage. It is essential always to bear in mind these three distinct parts of the name of a garden hybrid, even if, as is often done, one or other of the parts is omitted in actual usage; the three parts broadly correspond, of course, to the generic name, specific epithet, and cultivar-name of a non-hybrid cultivar (see above).

Let us consider these three parts in turn and see what types of name can be used in each part in actual practice—and how this affects the naming of new "hybrid cultivars."

The *first part*, the generic name, presents no difficulties, except in the case of new hybrids between two or more genera. Names of such "hybrid genera" are usually "manufactured" from a combination of the names of the parent genera (*e.g.* ×*Heucherella*, from *Heuchera* and *Tiarella*); in the case of hybrids between more than two genera, however, where a "combination" name would be unwieldy, it is permissible to make a new name by adding the termination *ara* to the name of a person connected with the plant concerned (*e.g.* ×*Sanderara* for a tri-generic orchid hybrid). Before making a new "hybrid generic" name, a botanist should be consulted, as a Latin description in proper, botanical form must be provided. It will have been noticed that a multiplication sign is placed *in front of* the names of "hybrid genera," but *after* the generic name in the case of hybrids within a single genus; further details on this point are given later.

The *second part* of the full name of a hybrid is a more tricky business. It is, as I have said, a collective designation for all the progeny of the

particular cross concerned, and it may take one or all of three possible forms:—

(1) If the parentage is known, a bare *formula* consisting of the names of the parents, in alphabetical order, connected with a multiplication sign, *e.g. Lewisia cotyledon* × *rediviva.*

(2) A name in Latin form (corresponding to a non-hybrid specific epithet), preceded by a multiplication sign, *e.g. Viburnum* × *bodnantense.*

(3) A vernacular phrase containing the word "hybrid," "cross," "grex" (Latin for flock or group), or other similar word, making evident the collective nature of the phrase, *e.g. Lilium* 'Bellingham Hybrids.'

Why do we have to have these three different forms for the second part of the full name, and when, to put it briefly, should we use which?

I must admit that practice on this particular point is as yet by no means fixed, and no doubt it will be modified considerably during the next few years, as more horticulturists try to apply the Code to the groups in which they are interested.

In order to understand the alternatives available, it will be helpful, I think, to consider first the *third part* of the full name, as the use of this, and of the second part, are very closely connected. The third part, as I have said, is a cultivar-name of a particular form of the hybrid concerned, and, in the first place, it is extremely important to realize that *every cultivated hybrid that is considered worth naming at all should receive a cultivar-name from the outset of its "career," even if, at the time, only one form is known, or is considered worth naming.* To take an actual example, at the time when the new hybrid *Viburnum* × *bodnantense* was described in the *Botanical Magazine*, only one form, or clone, of it had been "put into circulation," and yet that single clone was given a cultivar-name, 'Dawn.' The object of doing this was to be able, in the future, to refer by name to this particular clone and so avoid confusion with any later, and possibly inferior, forms of the same cross that might be produced. In the absence of the name 'Dawn,' less desirable clones could legitimately be passed off under the collective name *V.* × *bodnantense* without the acquirer realising that he was not getting the original and superior form.

Bearing in mind, then, the principle that *all* cultivated hybrids should have a third part, cultivar-name, we can turn again to the use of the various possible designations for the second part listed above. The choice of designations depends, broadly speaking, on *convenience*, that is to say, on what, in practice, will be found the most useful method of referring to the plants concerned. In principle, of course, every hybrid whose parentage is known has an appropriate formula-designation, and in certain cases such a formula would be sufficient as a second part designation without inventing either a Latin name or a vernacular collective name. For instance, when there are only a very few forms of a particular cross, it might not be considered necessary to

be able to refer to the forms collectively, and a second part name would not then be given. For example, *Rubus* 'Merton Thornless,' when raised, was the only form of the hybrid *R. rusticanus inermis* × *thyrsiger* to be put into circulation, and it was not given a second part designation other than the appropriate formula. On the whole, however, it is usually desirable to have a second part, collective designation, rather than a formula only. Whether such designation should be a Latin name or a vernacular phrase, or both, depends on a number of factors which, as I have said, are not yet fully worked out or appreciated. Broadly speaking, if there are a large number of cultivars of a particular cross and these cultivars form a well-marked group, distinct from other hybrid groups in the genus, it is useful to have a vernacular designation for general use, *e.g.* 'Bellingham Hybrids' for all cultivars of the cross *Lilium Humboldtii* × *pardalinum*. This purpose can, however, be equally well served by a Latin name, *e.g. Camellia* × *Williamsii* for all cultivars of the cross *C. japonica* × *saluenensis*. Whichever method is chosen, two points are of great importance. Firstly, if a Latin name is given, it *must* be accompanied by a Latin description. Secondly, a vernacular designation *must* contain some such word as Hybrids, Crosses, or the like, to distinguish it from a cultivar-name. The practice, in some groups, of giving "straight" cultivar-names as second part collective designations, followed by "var. so-and-so," is condemned by the Code. Existing names of this kind, however, can easily be brought into line by adding a word such as Hybrids or Grex to the old, second part, cultivar-name, and omitting the "var." thus, *Cattleya* 'Fabia' var. 'Prince of Wales,' would become *C.* ('Fabia Grex') 'Prince of Wales' (Grex can be abbreviated to G. if desired). This alteration may seem over-pedantic, but if, in the naming of cultivated hybrids, a clear distinction is not kept between second and third part names, confusion, as I have pointed out, is likely to result.

I will finish this section on the naming of hybrids with one or two additional points on the correct method of writing their names. Here are the full names of three cultivated hybrids:—

Rubus (*rusticanus inermis* × *thyrsiger*) 'Merton Thornless.'
Camellia × *Williamsii* 'Donation.'
Rose (Hybrid Tea) 'Richmond.'

The following points should be noted:—

(*a*) If a formula or a vernacular designation is used as a second part name, it should be placed in brackets between the generic name and the cultivar-name.

(*b*) If a Latin name is used as a second part name, and the hybrid is between plants belonging to the same genus, a multiplication sign should be placed between it and the generic name.

(*c*) The third part cultivar-name follows directly on the second part name and is placed in single quotes, as for cultivar-names of non-hybrids.

In many contexts it would not be necessary to write the second part name at all, but if it is omitted, the cultivar-name, strictly speaking, should be preceded by a multiplication sign, thus: *Camellia* × 'Donation,' but it would be no great crime to omit it, except perhaps in technical publications.

3. WHAT IS THE "CORRECT" NAME FOR A CULTIVAR?

It is a painfully familiar fact that many cultivars are known by more than one name, and that many cultivar-names have been applied to more than one cultivar—although the position is not so bad as it is in the case of botanical names! This multiplication of names is the inevitable result of many people naming many plants over a period of many years. It is a situation which we must accept and do our best to mitigate. The Code has a number of necessarily rather complicated provisions aiming at selecting the correct name for any cultivar. These provisions are important mainly to the comparatively few horticulturists and botanists who take on the unenviable job of sorting out the nomenclature of cultivated plants, though the results of their labours affect us all. The rules are set out fully in the Code, and here I will attempt only to pick out one or two of the more important.

The Code lays down two basic principles; though, as we shall see, these may be modified if undesirable name-changing can be avoided thereby.

(*a*) No name can be used if it does not conform to the various rules laid down in the Code (including proper publication of the name, with a description).

(*b*) If there are two or more names that conform with the Code, then the *earliest* name is the correct one; this is known technically as the principle of priority.

Now, obviously, as happens with botanical names, the strict application of priority might mean that a universally used name—say, Plum 'Victoria'—would have to be given up and replaced by a completely unknown one. This is unthinkable, and, as in the Botanical Code, there are clauses to prevent it happening. With cultivar-names, however, there is a particular complication, which does not apply to botanical names. The latter are all in Latin, whereas cultivar-names may be in many languages. This means that a cultivar, raised in one country under a name acceptable in that country, may be introduced into another country where the original name is quite unpronounceable or otherwise unsuitable. A new name is, of course, immediately invented by the introducer, and clearly, in many cases, it is useless to try to make the second country adopt the earlier, strictly correct, but unsuitable name. The Code, therefore, allows the retention of the second name as what it calls a "commercial synonym." Thus, Rose 'Permanent Wave' is a commercial synonym in the United States for the Rose raised in Holland as 'Mevrouw van Straaten van Nes.' In any formal list of Roses, both names should be given, together with any

other commercial synonyms that may exist. The coining of commercial synonyms is not, of course, to be encouraged, and should only be done if the original name is clearly unsuitable for the new country. Frequently names are translated or transliterated when a cultivar is introduced into another country, and such a translation or transliteration is not regarded in the Code as a *new* name, but as the original name in another form; no difficulty, therefore, arises as to priority in these particular cases.

Perhaps the most important section of the whole Code deals with the *Registration* of cultivar-names. In certain groups (*e.g.* Daffodils) international registration schemes already exist, and it is urged that further schemes, covering all important groups of cultivated plants, should be established as soon as possible. The function of such authorities would consist, primarily, of (1) registering new names and ensuring that they are in accordance with the Code, and (2) preparing, and keeping up to date, lists of cultivars in their groups. In addition, the authorities would choose a particular publication as the "starting-point" of the nomenclature in the group (so as to avoid dipping too deeply into the past in search of ever earlier cultivar-names), and would act as arbiters when a decision has to be made between two or more widely used names for the same cultivar. There is no doubt in the minds of those responsible for the Code that the existence of internationally trusted and respected registration authorities would do more than anything else to stabilize and simplify the naming of cultivated plants. It will obviously take some time before authorities can be set up for all—or even the majority—of important groups, but the International Committee is doing its best to push ahead quickly with this very important side of their work.

At the end of the Code there are sections dealing with certain special categories such as re-selected and improved cultivars, convarieties, clones, apomicts and line-hybrids, which are of interest mainly to specialists in breeding and taxonomic work on cultivated plants.

I hope I have said enough, in this short article, to convince readers of the JOURNAL that the Code is of some interest to them if they want to use the names of plants so that other gardeners, both here and abroad, can understand what they mean. The next step is to read the Code itself—first the Summary and then the full text that follows it. No doubt many who do so will be put off at first by the somewhat legal language used. One can only repeat the time-honoured defence by lawyers when similarly attacked—that to avoid ambiguity experience has shown that a certain amount of jargon is necessary! We have tried hard, in the Code, to keep it to a minimum.

The International Committee is anxious to receive suggestions for improving the Code, so that they can be discussed at the next Horticultural Congress. All such suggestions should be sent to the Secretary

of the Committee (DR. H. R. FLETCHER), c/o The Royal Horticultural Society, Vincent Square, London, S.W.1.

In the Historical Introduction to the Code (written by MR. W. T. STEARN, Secretary of the International Committee, during the production of the Code), Fellows of The Royal Horticultural Society will note, I trust with pride, the important part played by their Society, in co-operation with many other bodies and individuals in many parts of the world, in the preparation, drafting and publication of the Code. I hope that they will feel it their not unpleasant duty to make themselves and others familiar with the provisions of the Code, to follow its rules and recommendations when they use the names of cultivated plants, and to let the Secretary of the Committee know how they think it might be improved. Article I of the Code states that its aim is "to promote uniformity, accuracy and fixity . . . with the minimum disturbance of existing nomenclature"—an aim surely close to the heart of every Fellow of The Royal Horticultural Society.

I am grateful to MR. A. SIMMONDS, MR. W. T. STEARN and MR. P. M. SYNGE for help in the preparation of this article.

BUDDLEIA × PIKEI

H. R. Fletcher

WITH the object of producing a very late and free-flowering, perfectly hardy Buddleia, MR. A. V. PIKE, head gardener to COL. THE HON. J. J. ASTOR, Hever Castle, Edenbridge, Kent, on June 13, 1950, pollinated the stigmas of the flowers of one truss of *B. caryopteridifolia* with the pollen from the flowers of *B. alternifolia*. Fertilization soon was effected, capsules were visible within a week of pollination and within seven weeks the seeds had ripened. Straightway the seeds were sown and the resulting seedlings over-wintered in a cold frame. In April of 1951 the seedlings were planted in the open from pots and in the autumn of 1951 a few of them flowered.

In its native habitat *B. alternifolia* grows in dry open situations and in hedgerows in cultivated land in South-Eastern Kansu. With the exception of the Japanese *B. curviflora*, which in Hondo occurs as far north as 40°, it occupies the northernmost extension of the genus in Asia and as is to be expected is perfectly hardy in Britain. It makes a shrub or small tree with very slender graceful pendulous branches, with alternate lanceolate almost glabrous leaves and with clusters of lilac-purple flowers produced along the previous year's growth in May and June.

B. caryopteridifolia inhabits dry rocky situations in Yunnan at altitudes of from 5,000–10,000 feet and in Britain is on the borderline of hardiness. It forms a compact bushy plant of comparatively slow growth and the opposite leaves and young shoots are covered with a dense woolly stellate indumentum. On young shoots the leaves are

ovate, heart-shaped at the base, unevenly toothed and 3–6 inches long; on the branchlets of the second year they are much smaller and taper at the base. In favoured gardens where it is quite hardy and where it is allowed to grow naturally the panicles of lavender coloured flowers are borne on the previous season's growth in May and June. But in gardens such as Wisley where this species is decidedly tender and where it is cut back every year, the flowers appear on the current year's growth in August and September, the months during which FORREST on several occasions found it in flower in Yunnan.

B. × *Pikei*, which is a self-fertile hybrid, combines the characters of both its parents and is quite as hardy as the paternal one. In habit it is not so lax as is *B. alternifolia* but it is more open and much more vigorous than *B. caryopteridifolia*, making up to 6 feet of growth if it is hard pruned during early April. Like its maternal parent the young stems, leaves and inflorescence are covered with an indumentum of stellate hairs. Most often the leaves are opposite, but they may be opposite and alternate on the same plant and occasionally three leaves may arise at the same node. The largest leaves, those towards the base of the plant, are up to 6 inches long and 2½ inches broad, ovate to oblong and irregularly lobed or toothed in the lower half. Gradually the leaves change their shape and decrease in size, the farther away they are from the base of the plant, until those on the upper lateral branches are lanceolate to oblong lanceolate, up to 2 inches long and ¾ inch broad. The inflorescence, a collection of clusters of flowers, may be 24 inches long and each flower cluster arises from the axil of a foliage leaf and is produced on the current year's growth. Very strongly scented, the flowers, in shades of lavender-pink, are $\frac{3}{10}$–$\frac{4}{10}$ of an inch across.

Somewhat unusual among Buddleias, sprays of *B.* × *Pikei* will last 7–10 days as a cut flower in water.

As the owners of this hybrid have named it with a word of Latin form the name must needs be published with a Latin diagnosis or description which is here given.

Buddleia × *Pikei*, H. R. Fletcher *hybr. nov.*
(*B. alternifolia* Maxim. × *B. caryopteridifolia* W. W. Sm.)

Planta (hybrida) habitu erecto subrigido; caules indumento fugaceo lanato-stellato induti. Folia opposita vel alterna; inferiora ovata vel oblonga, ad 15 cm. longa, 6 cm. lata, irregulariter lobata vel sinuato-dentata, infra molliter stellato-pubescentia, superiora lanceolata vel oblongo-lanceolata ad 5 cm. longa, 1·5 cm. lata, infra dense stellato-tomentosa. Flores in paniculam foliatum cymarum dispositi, in ramis hornotinis enati. Bracteae lineari-lanceolatae ad 5 mm. longae. Calyx 4–5 mm. longus, tubulatus, tomento tenui stellato vestitus. Corollae tubus duplo vel triplo calyce longior anguste cylindricus, extra minute pubescens; limbus 8–10 mm. diametro lobis oblongis vel paulo obovatis 3–5 mm. longis 2–3 mm. latis saepe margine recurvis. Stamina in medio tubo inserta. Ovarium albo-tomentosum stylo calycem aequante.

The name *B.* × *Pikei* covers all the progeny resulting from the cross *B. alternifolia* × *B. caryopteridifolia.* Only one cultivated variety or cultivar of this cross so far has been named and that is *B.* × *Pikei* 'Hever' which with the limb of the flower Rose Purple (H.C.C. between 533/1 and 533/2) and the throat a bright Indian Orange (H.C.C. 713) received the Award of Merit when shown before the Floral Committee B on September 8, 1953 (Fig. 4).

A dried specimen of *B.* × *Pikei* has been deposited in the herbarium of the British Museum (Natural History).

Curtis's Botanical Magazine

TAB. 203

ARBUTUS UNEDO VAR. RUBRA

'The common Strawberry Tree is too well known to require any description of it here, being at present in most of the *English* Gardens, and is one of the greatest Ornaments to them in the months of *October*, *November*, and frequently great Part of *December*, that being the Season when the Trees are in flower, and the Fruit of the former Year is ripe, for the Fruit is a whole Year growing to Perfection; so that the Fruit which is produced from the Flowers of one Year, do not ripen till the Blossoms of the succeeding Year are full blown; so that when there is Plenty of Fruit and Flowers upon the Trees, they make a goodly Appearance, and at a Season when most other Trees are past their Beauty'. So wrote Philip Miller in 1759, in the seventh edition of his famous Gardeners Dictionary where he first mentioned the 'pretty Variety' with red flowers which is illustrated here. That the Strawberry-tree was well known two centuries ago is not surprising for it had then already been in cultivation for over a hundred years—the first records of it being in Parkinson's Paradisi in Sole Paradisus Terrestris, 603, fig. 5 p. 601 (1629) and in Johnson's edition of Gerard's Herball, 1495, fig. p. 1496 (1633). Miller, who knew two other varieties, one with 'large oval Fruits', the other with double flowers, did not provide names for any of them, nor was this done in Hunter's edition of Evelyn's Silva, published in 1786, the account there (**2,** 83) being, in fact, a plain copy of Miller's. However, varietal epithets were supplied in Aiton's Hortus Kewensis, **2,** 71 (1789) and our plant received the trivial *rubra.*

As Miller said, the Strawberry-tree makes a very fine show when

loaded with flowers and fruits, but in the less mild parts of the country, e.g. at Kew, fruits are very seldom as abundant as is usual in milder areas. This is probably because there are relatively few insects about to effect pollination at the season when the trees are in flower. Occasionally conditions are more propitious and a heavy crop follows, as occurred at Kew in 1934 when the trees were loaded with fruits. But whether it fruits well or not, the var. *rubra* invariably makes a fine show on account of its red flowers, which are borne in abundance, as is usual with *A. unedo* once the plant is established.

A. unedo var. *rubra* is presumably of garden origin. The species is very variable in some respects, e.g. size and shape of the leaves and the amount of anthocyanine in the stems, petioles, and inflorescences. The flowers may be greenish-white or more or less flushed with red, and the var. *rubra* no doubt represents a variant with an unusual amount of red in the corolla. Mackay, Flora Hibernica, 182 (1836) mentions that a 'single tree of the scarlet-flowered variety' was pointed out to him near the entrance to Glengarriff, growing on red slate, and thus presumably growing wild, whence it would appear that var. *rubra* may occasionally arise in natural populations of the species. *Arbutus unedo* is, of course, native in western Ireland, and an account of its occurrence there, together with a possible explanation of its remarkable distribution—it is widespread in the Mediterranean region and extends as far north as La Rochelle in the south-western littoral of France, and then is found much farther north in Brittany and western Ireland—will be found in the Journal of Ecology, **37**, 365—388 (1949). Dr. E. K. Janaki Ammal has determined the chromosome complement of the plant figured as 2n—26.

Cultivation. The Strawberry-tree is hardy at Kew, and grows well in the poorest of soils. It is easily raised from seeds, but vegetative propagation is necessary to perpetuate var. *rubra* for it does not come true from seed. Tip-cuttings are recommended as the best method of increase, though grafting can be used if necessary. The variety received an Award of Merit from the Royal Horticultural Society on 20 October 1925, when shown by Messrs. Gill.

[Excerpt from Part 3, Vol. 169 of *Curtis's Botanical Magazine* with specimen plate. The full description and text figures given in the Magazine have been omitted here. Details of a special offer relating to the first five volumes of the New Series of the *Botanical Magazine* were published in the December 1953 JOURNAL.]

Arbutus unedo var. rubra ANN V. WEBSTER *del.*

A specimen plate from the Botanical Magazine, Volume 169, part 3

Photo, W. Abbing

PERPETUAL FLOWERING CARNATIONS

FIG. 1—'Royal Maize' a typical example of the Royal type of Perpetual Flowering Carnation

Photo, W. Abbing

FIG. 2—A new Perpetual Flowering Picotee 'Dainty Lady'

Photo, Allwood

FIG. 3—A House full of Perpetual Flowering Carnations 'Allwood's Market Pink' (Photograph taken in November)

Photo, J. E. Downward

FIG. 4—*Buddleia* × *Pikei* 'Hever' **A.M.** September 8, 1953. Exhibited by COL. THE HON J. J. ASTOR, Hever Castle, Kent (See p. 21)

FIG. 5—*Agapanthus caulescens* (See p. 27)

Photo, J. E. Downward

FIG. 6—*Agapanthus inapertus albus* (See p. 27)

FIG. 7—The frost laboratory at East Malling Research Station: the refrigerated chamber is seen through the doorway on the left, and the temperature measuring and control apparatus are in the instrument room on the right (See p. 29)

SOME ASPECTS OF SPRING FROST DAMAGE TO FRUIT AND ITS CONTROL

Photos, East Malling

FIG. 8—Strawberry and Potato plants undergoing experimental sprinkling during exposure to frost. The ice formation on the sprinkled plants (right) protects them from damage (See p. 33)

FIG. 9—Ice formed on Apple trees by experimental sprinkling during a 10-hour winter frost. Two of the sprinklers can be seen (See p. 33)

Photos, East Malling

FIG. 10—Potato plants after exposure to −4° C. (24·8° F.): (right) sprinkled, undamaged; (left) control, severely damaged (See p. 33)

Photo, Myles Cooper

FIG. 11—*Eucryphia nymansensis* 'Nymansay' at Pylewell Park (See p. 43)

THE GENUS AGAPANTHUS

The Hon. Lewis Palmer

THE cultivation of Agapanthus in all but the milder parts of the country has been undeservedly neglected. There seems to be a general view that the genus is only half-hardy, and therefore only suited to the south-western counties. This is very far from being the case, and a genus that provides so many hardy species and hybrids producing an abundance of flower of all shades of blue from July to October is too valuable to be left in continued neglect. It may be that the complete confusion that has reigned in the past over the nomenclature of this genus has contributed to the reserve with which it is regarded by both gardeners and nurserymen. It is therefore worthwhile making an attempt to give an account of the species of Agapanthus that have hitherto been described in the hope that such a list may be of assistance to Fellows who are disposed to take an interest in this very beautiful genus.

One of the factors contributing to this confusion has undoubtedly been the curious history of the name *Agapanthus umbellatus*. This confusion has been most ably unravelled by MISS FRANCES LEIGHTON (MRS. ISAAC) in *Journal of South African Botany*, April, 1939. When L'HERITIER, in 1788, established the genus Agapanthus he applied the specific name of *umbellatus* to the single species then known. But this species, which is native of Table Mountain and the extreme south-west parts of the Cape, had been introduced to cultivation as early as 1687, and is stated in PLUKENET'S *Almagestum* to have flowered in Hampton Court Gardens in 1692. It was assigned by LINNAEUS to the genus Crinum, and figures in the *Species Plantarum* as *Crinum Africanum*. Accordingly, when L'HERITIER established the genus Agapanthus, he should have retained the existing specific name, and the correct name of this plant is *A. africanus* (L.) Hoffmansegg. REDOUTÉ carried the confusion further by publishing in his *Liliacées*, in 1813, t. 403, an illustration of a second species, native of the Eastern province of the Cape. To this illustration he gave L'HERITIER'S name, stating that he regarded this larger form as conspecific with the smaller species already described. Thus two species, whose ranges in the natural state do not overlap at any point, came to be cultivated under the name of *A. umbellatus*, which applied legitimately to neither of them. The confusion was rendered worse in the latter part of the nineteenth century by the introduction of a third species from Natal, and a fourth species from the Orange Free State, both of which also continued to be known under the name of *A. umbellatus*. As the different species of the genus Agapanthus hybridize very freely with each other, innumerable hybrids began to appear in gardens, which added further to the general confusion. It is a curious fact that the commonest species in cultivation has been grown freely in gardens since at least 1813 without ever having been validly named until it was named *A. orientalis* by MISS LEIGHTON in 1939.

The genus Agapanthus is apparently confined to the Union of South Africa, and is to be found from the Cape Peninsula along the coast as far as Natal, and northwards, along the Drakensberg range of mountains as far as they extend, up to an elevation of 6,000 feet and more. So far as is known at present no representative of the genus has been found north of the Limpopo river. In giving any account of the distribution of this genus it should be observed that it has been hitherto only imperfectly studied by the botanists, and that several species are known, some of which are in cultivation in South Africa, which have not yet been described or named.

It will perhaps save confusion to list the names which apply to species known to grow wild in South Africa, and thereafter to list any names which it has not yet been possible to identify with species known to grow in the wild; these have mostly been applied to plants of horticultural origin.

The genus appears to fall naturally into two sections, one in which the flowers are short tubed with spreading segments and with a spreading umbel; and the other in which the flowers are long tubed and either slightly spreading or closed at the mouth, and in which the flowers in the umbel hang down.

The centre of distribution of the first section appears to have been from the triangle Port Elizabeth—Cradock—East London. Where the species inhabit the coastal region they are usually evergreen and are probably best regarded as half-hardy subjects. Where on the other hand they have migrated to the higher country they have adopted a deciduous habit and appear to be perfectly hardy in cultivation in Great Britain. The species belonging to this section as they occur in nature from west to east are as follows:

A. africanus (L.) Hoffmgg. Native of Table Mountain and S.W. Cape Province, evergreen, small, deep blue, violet or, very occasionally, white, late flowering.

A. longispathus Leighton. Native of the Eastern Province round Fort Beaufort, deciduous, small, pale blue, middle season, hardy.

A. orientalis Leighton. Native of the Eastern Province, Pondoland, Transkei and coastal region, evergreen, large, blue, pale blue, white, very variable with forms flowering early and late. The commonest Agapanthus in cultivation.

A. campanulatus Leighton. Native of middle highlands of Natal, deciduous, leaves with purple flushed bases, blue or white, middle season, hardy.

A. gracilis Leighton. Native of Zululand and Natal highlands, deciduous, hardy, medium size, clear rich blue, late flowering.

A. patens Leighton. Native of Caledon River region of Orange Free State and Basutoland, deciduous, small, blue or white, early flowering, very hardy.

To this section also belong the majority of the species above referred to that have not yet been named.

The other section seems to take over on the Natal/Swaziland border and to extend along the high country of the eastern Transvaal as far as Pietersburg in the North Transvaal. All the species are deciduous. It consists of:

A. inapertus Beauv. Recorded from the whole length of the eastern Drakensberg from Paulpietersburg in Natal to Pietersburg in the North Transvaal. Deciduous, very tall, deep blue, white, middle season. Foliage glaucous with conspicuous midrib. Needs some protection (Fig. 6).

A. pendulus L. Bolus. Native of East Transvaal around Graskop. Deciduous, large, blue, indigo or violet, late flowering, hardy. Foliage green.

A. Hollandii Leighton. Native of East Transvaal around Alkmaar. Deciduous, medium size, blue or deep blue, mid season, a very graceful beautiful species. Hardy. Foliage glaucescent.

A. Walshii L. Bolus. Not in cultivation and only known from a single gathering made in 1918. There must therefore remain some doubt as to its status until it is rediscovered. It is interesting in that its locality is in the south-west of the Cape Province in the area of *A. africanus* (L.) Hoffmgg. and is thus separated by 1,000 miles from the nearest other species with tubular dependent flowers. The herbarium specimen shows a very distinct plant.

N.B. Although white forms of *A. campanulatus*, *A. patens* and *A. inapertus* are listed here, there is no record of white forms of these species occurring in the wild. White forms of all three species exist in cultivation and are beautiful garden plants. They are probably of horticultural origin.

Names that have not yet been identified with natural species, and synonyms:

A. Ardernei. Has not been published, sometimes applied to hybrids of *A. orientalis.*

A. caulescens Spreng. This plant was raised by SPRENGER in his nursery at Naples from seed sent to him from the Transvaal in the last decade of the last century, and still survives in one or two gardens in the British Isles. It is large and markedly caulescent, but not more so than *A. inapertus* or *A. pendulus*, deciduous, with green leaves of which the edges are plicate in consequence of the constriction of the tight sheaths enclosing their base. It is late flowering, tall, with a spreading umbel of open clear blue flowers. But as it has hitherto not been discovered in the wild in South Africa, and is indeed unknown there, its status must remain for the present in some doubt. Moreover, it appears to a considerable degree to combine the characteristics of the two sections of the genus, which indicates that investigation should be undertaken to test the possibility that the original seed

received by SPRENGER might have been of hybrid origin. It is certainly hardy in the warmer counties (Fig. 5).

A. giganteus. Illustrierte *Gartenzeitung*, March 1880 (no author), possibly a luxuriant form of *A. orientalis* Leighton.

A. globosus. This plant was exhibited in 1905 at the R.H.S. It was stated to be deciduous and to have been sent to MESSRS. BULL from the Orange Free State. The figure in *Gardeners' Chronicle*, ser. III, xxxviii, p. 237, indicates a plant of probably hybrid origin with a large admixture of the blood of *A. patens*. The writer has not seen it in cultivation.

A. insignis Bull. Described and figured in *The Garden*, July 1903, and in *Rev. Hort. Belge*, vol. XXXII (1906). The original plant is said to have been sent from South Africa and to have been distinguished by the lavender colour of the flowers and by a whitish patch on the base of each leaf. The photographs show a many-flowered umbel, the flowers having long tubes and being borne on long pedicels. It has the appearance of being of hybrid origin. The writer has not seen it in cultivation.

A. intermedius. Has not been published and is applied to various hybrids.

A. minor Lodd. *Bot. Cab.* 92 = *A. africanus* (L.) Hoffmgg.

A. Mooreanus. This name seems to appear first in NICHOLSON'S *Dictionary of Gardening*, 1884, as *A. umbellatus Mooreanus*, a new plant introduced in 1879. It is said to be of dwarf habit and perfectly hardy. The brief particulars there given would seem to fit either *A. patens* or one of the smaller forms of *A. campanulatus*. I am informed by LADY MOORE that the original plant was sent from South Africa to SIR FREDERICK MOORE by a young German, who had been a student at Glasnevin, and was named 'Mooreanus' by the student in honour of SIR F. MOORE. However, in the course of time, the use of the name has become transferred to a bewildering multitude of hybrids of horticultural origin in which as a rule the characters of the two above species generally predominate.

A. multiflorus Willd. Applied to a plant which had not flowered and of which no specimen is preserved. *Nomen nudum*.

A. praecox Willd. This name was given by WILLDENOW to a plant received in Berlin from South Africa. A specimen is preserved in the Willdenow Herbarium. It was characterized by having broad leaves, notably long pedicels and by flowering earlier than *A. africanus* (L.) Hoffmgg. It may prove on further investigation that this name should by virtue of priority supersede one of the names listed for the Species.

A. Weilligii. *Gard. Chronicle* = *A. inapertus*.

In conclusion it should perhaps be noted that the great majority of Agapanthus in cultivation in this country are of hybrid origin.

SOME ASPECTS OF SPRING FROST DAMAGE TO FRUIT AND ITS CONTROL

W. S. Rogers

(EAST MALLING RESEARCH STATION, ENGLAND)

(*Reprinted with additions from The Report of the 13th International Horticultural Congress*, 1952)

FROST is one of the most powerful forces of nature, and perhaps the hardest to control on a large scale. Damage to fruit blossoms by frost causes serious loss, not only by destroying the current season's crop, but often by starting a cycle of biennial bearing, resulting in alternation of scarcity and glut over large areas and for long periods.

Reviews of the extensive fundamental and practical work on frost damage to plants include those of LEVITT (8, 9), SCARTH (17), LUYET and GEHENIO (10) and the Imperial (now Commonwealth) Bureau of Fruit Production (4). These give a good background to the subject.

Various aspects of the frost problem have been under intensive study by workers at East Malling for some years. Our work has been assisted by a special frost laboratory, in which controlled low temperatures are obtainable (Fig. 7), and by the use of fine wire thermocouples, with which the temperature of the flower or other plant tissue can be followed from moment to moment. The field work has been helped by the use of a caravan, equipped as an instrument room.

This paper will consist mainly of a brief survey of some of the results. Fuller details of the latest experiments will be reported elsewhere in due course.

BLOSSOM AND AIR TEMPERATURES

The temperature of the plant tissue itself may vary considerably from the air temperature. Our thermocouple measurements confirm that, on a dull windy night the blossom temperature will be near the air temperature, or slightly below it, owing to transpiration. On a clear windless night, in a typical radiation frost, a blossom fully exposed to the sky will lose heat rapidly by radiation, and is commonly from 1° to 3° F. (0·6° to 1·7° C.) colder than the air. Blossoms screened from the sky and exposed to radiation from the earth may, on the other hand, be slightly warmer than the air temperature.

The standard Meteorological Office method of minimum air temperature measurement is by a minimum thermometer at a height of 4 feet (1·2 m.) from the ground, in a Stevenson screen. We have found that unscreened M.O. type minimum thermometers and also good Six's thermometers, exposed at the same height, record minima about 1° or 2° F. (0·6 to 1·1° C.) lower than those recorded in a Stevenson screen, during a typical radiation frost.

Also, an M.O. type thermometer, screened by a double cylinder of light tinplate (the so-called " cocoa-tin screen ") commonly records minima about 1° F. lower than that in a Stevenson screen.

Thus in many radiation frosts blossoms at a height of 4 feet will experience a temperature about the same as that recorded by an exposed M.O. type minimum thermometer or a good Six's thermometer at the same height, and about 1 or 2° F. lower than that recorded in a Stevenson screen.

It is desirable that temperature measurement methods should be standardized, as far as possible. But unfortunately no one method is equally suitable for all purposes; and provided that the methods of measurement and conditions are defined, and the differences allowed for, the records become reasonably inter-comparable.

FROST DAMAGE

Frost damage occurs when ice forms within the plant tissues, and may be due either to mechanical damage or to irreversible physico-chemical changes in the protoplasm (8). Our temperature measurements show that the tissues commonly supercool to about 28° or 29° F. (— 2·3° to — 1·7° C.) before any ice formation takes place. If supercooling persists and no ice is formed, the plant is undamaged, even by severe frost; but persistent supercooling is less common in the orchard than in the laboratory.*

Many factors affect frost damage, as discussed later; but our studies, following the earlier work at East Malling of Field (3), show that the typical march of frost damage in an Apple, such as 'Cox's Orange Pippin,' in full blossom is as follows:—Temperatures here referred to are blossom temperatures. At about 28° F. (— 2·3° C.) a layer of ice forms beneath the skin (including the epidermis and hypodermis) and lifts it from the cortex. This damage heals readily. At about 27° F. (— 2·8° C.) damage occurs to the base of the style, in some, but not all, of the flowers. This damage, which shows as a brown discoloration after thawing, is fatal, and may spread to the placenta and ovules. If the temperature falls to 25° or 26° F. (— 3·9 to — 3·4° C.) the damage becomes widespread and the crop is reduced.

It may be noted that loss of less than 50 per cent. of the blossoms of tree fruits does not usually affect the crop.

FACTORS AFFECTING DAMAGE

Our work confirms that rapid cooling or thawing is more dangerous than gradual cooling or thawing. The condition of the plant greatly affects its susceptibility to frost damage. Thus a "hardened" plant, conditioned by previous exposure to low temperature, is much more

* Supercooling, freezing and thawing of plant cells, and ice inoculation from cell to cell, were demonstrated at the Conference by a film showing the freezing of staminal hairs of Tradescantia and epidermis of Cherry, under the microscope. A separate paper on this aspect is being prepared.

resistant than one not hardened. Similarly, in general, the nearer the plant is to dormancy, the more resistant it is (12). Most apples are more susceptible to frost in the fruitlet stage than at full blossom; but fortunately damaging frosts seldom occur so late in the season (3). The Apple variety 'Bramley's Seedling,' forms an exception for it is most susceptible to damage at the green bud stage (12).

We have found that flowers with a dry surface are less damaged than wet ones. Thus dew can play an important part in frost damage. Frozen dew probably commonly supplies the first ice crystal that inoculates the tissue and initiates freezing. Plants that are internally dry supercool more readily and are less damaged by frost than those liberally supplied with water (12).

NATURAL RESISTANCE

Our tests have shown that the range of natural resistance to frost damage in our fruit plants (as distinct from variation in time of blossoming) is unfortunately small. Even where some apple varieties commonly fruit better than others, in a year of some frost damage, the difference appears to be due to ability to set a large percentage of the few surviving blossoms, rather than to inherent resistance. While this suggests that breeding for frost resistance will be difficult, it nevertheless focuses attention on other useful points to study. Among varieties which show a capacity to crop relatively well, in spite of some frost damage are 'Worcester Pearmain,' 'Ellison's Orange' and 'Howgate Wonder' Apple, 'Czar' Plum, and 'Conference' Pear. 'Conference' and 'Howgate Wonder' both have a tendency to produce parthenocarpic fruits. Varieties which are often more frost damaged than others include 'Bramley's Seedling' Apple and 'Madame Lefebvre' Strawberry.

FRUIT SETTING BY GROWTH SUBSTANCES

Attempts to induce frost-damaged blossoms to develop fruits by the aid of growth substances have so far achieved little success. A mixture of growth substances, sprayed by SWARBRICK (17) on frost-damaged blossoms of 'Miller's Seedling' Apple, induced the production of some small fruits; but a wide range of growth substances tested by MODLIBOWSKA (10) on 'Cox's Orange Pippin' and 'Ellison's Orange,' all proved ineffective.

Nevertheless, as knowledge increases concerning the substances responsible for fruit swelling, further progress may be possible on these lines.

FROST AVOIDING MEASURES

Of the available protective measures, by far the cheapest and simplest are those which avoid the frost. The knowledge that just as hot air rises, so cold air sinks, is vital in relation to choice of sites for fruit plantations. Hillsides, from which the cold air drains away, are frequently several degrees warmer than the valley bottoms which receive the cold air (1, 2).

Late blossoming varieties escape many frosts. Unfortunately no late blossoming Apple varieties of high market quality are available. Breeding such may take a long time, but the correlation which we have found between late leafing and late blossoming may help in sorting out new late blossoming varieties from sets of seedlings, while still in a juvenile stage.

Other possible measures to lessen the risk of frost damage are to choose a pruning system that ensures opening of blossom over a relatively long period. One such is the "renewal" pruning system in which much blossom is produced on two-year-old wood as well as on spurs. It is found that the blossoms on the younger wood open later than those on spurs (15). Since we have confirmed that blossoms which face the earth are often a degree or so warmer than those which face the sky, it may well be that the Swiss "Oeschberg" pruning system, in which spurs are retained only on the under side of the branches, owes some of its efficacy to its partial protection of the blossoms from radiation to the sky at night in frosty weather.

The effects of different methods of pruning on frost damage should be worth testing experimentally.

The use of anti-radiation shields or mats for covering plants on frosty nights has long been known to gardeners, but it is only practicable on a limited scale. We have found that up to 4° F. (2·3° C.) can be gained by hessian screens. A layer of fish-netting, on the other hand, has no protective effect: this is not surprising, since it only intercepts about 6 per cent. of the radiation (13).

GROUND COVER

The soil itself provides an important heat reservoir. Any insulating layer will lessen the heat transferred from the soil to the air at night. Thus air temperatures are lower over swards (2) or mulches than over hard bare soil. WAKIL (19) at East Malling, has recently recorded greater frost damage to Black Currants in a straw mulch than in clean cultivated ground, although the minimum temperatures at 2 feet (60 cm.) high were only 0·5° to 1·5° F. (0·3° to 0·9° C.) lower. Loose and dry soil is a better insulator than hard and wet soil (7). Thus grass orchards should be kept mown short during the blossom periods, straw should not be applied to Strawberries till as late as possible, and spring cultivations in cultivated plantations should be carried out early enough for the soil to be repacked before the blossom season begins. The differences involved in these cultural measures may only amount to about 1° F. at 4 feet, and about 2° F. near ground level; but these small differences may be important in a frost of marginal severity.

PALLIATIVE MEASURES

The most widely used palliative measures are still oil-burning orchard heaters (1), but methods which are less laborious and expensive are being sought. Wind circulating fans and infra-red heaters are being

tested by the National Institute of Agricultural Engineering, and will not be discussed in this paper. The use of water sprinklers has now been tested by workers in several countries (6, 20) and has received intensive study at East Malling (13, 16).

Water sprinkling, for protection from frost, is actually a heating method. The heat released as the water cools to the freezing point is relatively little (1 cal./gm. °C.); the main heating effect comes from the release of latent heat of freezing, 80 calories per gm., as the water turns to ice. The amount of heat produced naturally depends on the amount of water frozen. If there is a surplus of water, the temperature is maintained at or near 32° F. If less water is applied than the maximum that can be frozen, under given conditions of frost, the object on which it freezes attains a temperature between 32° F. and that of the surrounding frosty air, representing a balance of heat gains and losses.

A laboratory test of sprinkling Potato and Strawberry plants during exposure to frost (photographed through the inspection window of the frost chamber) is seen in Fig. 8. The control plants (left) are already severely damaged (the Potato is wilting); but the sprinkled plants, on which ice is forming, remain at a safe temperature and are undamaged. The appearance of Potato plants, after thawing, from a similar experiment in which the temperature was lowered to — 4° C. (24·8° F.) is seen in Fig. 10. The fine wire thermocouples and some discs of Potato tissue, used as standard "artificial blossoms" which turn black when frost damaged, can also be seen. The double cone above the sprinkled plants in Fig. 8 contains a thermocouple for measuring the air temperature in the sprinkled area.

The result of sprinkling Apple trees during a 10-hour winter frost (min. — 6·7° C., 20·0° F.) is shown in Fig. 9. Although the load of ice caused the branches to bend, it did not break them.

Further details of these experiments are now in the press (22).

In theory, a precipitation of about 1 mm. per hour would, in freezing, counteract the heat lost by radiation to a clear sky at night; but in practice a larger amount of water is needed to maintain a safe temperature during frost, in a treated area of limited extent. This is due to inflow of cold air from other areas and to edge effects. The larger the treated area, the greater the efficiency of the sprinklers.

In the limited number of experiments which it has so far been possible to carry out at East Malling it appears that the relation between precipitation rate and temperature rise is of the following order.

Precipitation rate, mm./hr.	2	4	6
Temperature rise °F.	3·5	6·0	8·0
" " °C.	2·0	3·4	4·5

These figures refer to a sprinkled area of ¼ acre and a wind movement of 2 m.p.h. (0·9 m./sec.).

If it is assumed that 28° F. (— 2·3° C.) is the critical temperature for frost damage, and that the bud temperature is 1·5° F. (0·8° C.)

lower than screen temperature, then the relation between screen temperature and the amount of precipitation required for protection from frost damage is as follows:—

Precipitation rate, mm./hr.		2	4	6
Protection given in screen minimum of	°F.	26·0	23·5	21·5
	°C.	−3·3	−4·8	−5·8

Under these conditions, small rotary sprinklers, such as those used by JEFFREE (5) giving 3 mm./hr. (at 25 to the acre) would protect from frosts in which the screen temperature is 24·5° F. (− 4·2° C.) or above; oscillating pipe lines giving 4 mm/hr., from 23·5° F. (− 4·8° C.); and rotary rainers giving 5 mm./hr., from 22·8° F. (− 5·3° C.). If the wind speed were greater than 2 m.p.h. the temperature rise and effective protection would be correspondingly less.

Further experiments, both on precipitation rate and on temperature at which to begin and end sprinkling, are required. From the point of view of maintaining the plant temperature, turning on the water at a temperature rather lower than 32° F., say about 30 °F. (− 1·2° C.), is probably reasonably safe, but in practice, when using surface piping, we find it safer to turn on at 32° F., to avoid the risk of blocking of nozzles with ice. We have found that there is no need to continue sprinkling once the air temperature has risen again above 32° F. If the sun has already risen, and the air temperature is rising fast, it is probably safe to turn off at 30° F., with consequent saving of water.

For permanent installations it is desirable to have the main pipes running underground, or else overhead (with arrangements for effective draining), to avoid interference with cultivation and to escape danger of ice formation in the pipes. If portable pipes are used they should be drained after each operation. It must be recognised that water distribution by most sprinklers is far from even. Maintenance of the correct pressure is very important. The use of good strainers to avoid nozzle blockage is essential. Other practical points are mentioned in a recent paper (13).

For success, the requirements are:—suitable and reliable sprinkling equipment, a large water supply, a plant that can stand the ice load, and a soil that is not damaged by the heavy precipitation.

Advantages of the method are that labour costs are low, in fact night labour can be eliminated if thermostatic control of the sprinklers is used. This has been done successfully at East Malling on a small scale.

Disadvantages are the large water supplies needed and the relatively high capital cost of the equipment. The latter can be offset to some extent by using the equipment for normal irrigation in summer, however. On holdings already equipped with irrigation apparatus, frost protection of a limited area can already be undertaken at little cost.

Watering off the frost, (by a single application of water on the morning following the frost).

This treatment has formed the subject of several recent experiments (MODLIBOWSKA, 21). It is clear that this operation is generally useless and may be harmful. Only if the blossoms are still undamaged at the time of watering, and the single application of water raises the temperature for a crucial short period, during which unwatered blossoms are killed, is any benefit likely to be gained; and it is not possible to forecast when such conditions will occur.

CONCLUSIONS

There is no simple panacea for all frost problems; but the application of present knowledge can already do much to lessen frost risks. For instance, choice of suitable site and variety, modification of cultural measures and the use of certain palliative measures in suitable cases can do much to avoid or mitigate frost damage. Further research is likely to lead, in due course, to new developments which may still further lessen the dangers from frost.

ACKNOWLEDGEMENTS

I wish to thank my colleagues DR. IRENA MODLIBOWSKA, and Messrs. J. P. RUXTON and C. H. SLATER for their valuable collaboration in this work.

SUMMARY

A brief general survey of the problem of frost damage to fruit is made, and certain aspects under study at East Malling are described.

The value of tissue temperature measurements, using fine thermocouples is mentioned. Quite small temperature differences can have large effects on frost damage. Apple blossoms are generally undamaged at 28° F. (— 2·3° C.) and killed at 25° or 26° F. (— 3·9 or — 3·4° C.) unless supercooling occurs. Factors affecting resistance are discussed.

Frost avoiding is the best protective measure. The importance of choice of sites with good air drainage is stressed. Cultural treatments which favour absorption of heat by the soil by day and transfer of the heat to the air by night are discussed. Straw mulches can increase frost damage. Late blossoming varieties and pruning methods which spread the blossom season, or which shelter blossoms from outward radiation, can be helpful.

Frost protection by continuous water sprinkling is described. From field and laboratory experiments it is provisionally estimated that with a sprinkler array of ¼ acre, and an air movement of 2 m.p.h. (0·9 m./sec.), a precipitation rate of 2 mm/hr. will protect from a frost giving a screen minimum of 26° F. (—3·3° C.), a rate of 4 mm./hr. from 23·5° F. (— 4·8° C.) and a rate of 6 mm./hr. from 21·5° F. (— 5·8° C.). Practical points in the use of the method are discussed.

REFERENCES

(1) BUSH, R. (1945): *Frost and the fruitgrower*. Cassell & Co. Ltd., London. 119 pp.
(2) CORNFORD, C. (1938): "Katabatic winds and the prevention of frost damage." *Quart. J. Met. Soc.* **64**, 553–87.

(3) FIELD, C. P. (1942): " Low temperature injury to fruit blossom. II. A comparison of the relative susceptibility and effect of environmental factors on three commercial varieties." *Rep. E. Malling Res. Sta. for 1941* (1942), 29–35.
(4) IMPERIAL BUREAU OF HORTICULTURE & PLANTATION CROPS (1945): " Spring frost damage in orchards and its possible prevention." *Tech. Comm. No. 15*, 22.
(5) JEFFREE, J. H. (1950): " Some experiments on the protection of fruit against spring frost." *Fruit Year Book.* Roy. Hort. Soc. (London), 100–104.
(6) KESSLER, O. W. & KAEMPFERT, W. (1940): " Die Frostschadenverhutung." *Wissenschaftliche Abhandlungen* VI. 208–229.
(7) KING, H. W. (1948): *Frost control in the Australian dried fruit areas.* Australian Dried Fruits Assoc. Melbourne. Pp. 54, 55.
(8) LEVITT, J. (1945): *Frost killing and hardiness of plants. A critical view.* Burgess Publ. Co. Minneapolis, Minn. 211 pp.
(9) LEVITT, J. (1951): " Frost, drought and heat resistance." *Ann. Rev. Plant Physiology*, **2**, 245–68.
(10) LUYET, B. J. & GEHENIO, G. M. (1939): " The physical states of protoplasm at low temperatures." *Biodynamics*, **48**, 1-128.
(11) MODLIBOWSKA, I. (1951): " The effect of certain growth-promoting substances upon frost-damaged apple flowers." *Rep. E. Malling Res. Sta. for 1950* (1951), 65–70.
(12) MODLIBOWSKA, I. (1952): " Low temperature injury and frost resistance of plant tissues with special reference to fruit trees." *Proc. VIII Int. Cong. of Refrigeration.* (In the press.)
(13) ROGERS, W. S. (1951): " Protection from spring and autumn frosts by continuous water sprinkling." *Grower*, **36**, 626–8, and *Rep. E. Malling Res. Sta. for 1951* (1952), 197–198.
(14) ROGERS, W. S. & BEAKBANE, A. B. (1951): "The effect of netting and hessian anti-frost screens and of brick walls on air temperatures." *Rep. E. Malling Res. Sta. for 1950* (1951), 60–64.
(15) ROGERS, W. S. & PRESTON A. P. (1947): "Renewal and established spur pruning of mature apple trees. *Rep. E. Malling Res. Sta. for 1946* (1947), 49–54.
(16) ROGERS & MODLIBOWSKA, I. (1950): " Low temperature injury to fruit blossom. III. Water sprinkling as an anti-frost measure." *Rep. E. Malling Res. Sta. for 1949* (1950), 63–68.
(17) SCARTH, G. W. (1944): "Cell physiological studies of frost resistance: a review." *New. Phytol.* **43**, 1–12.
(18) SWARBRICK, T. (1947): "A review of recent researches on growth-promoting substances in horticulture." *Sci. Hort.* **5**, 27–39.
(19) WAKIL, A. (1952): " Studies on the use of certain mulches and weed-killers in fruit plantations." Thesis presented to London University for the degree of Ph.D. 1952.
(20) WITTE, J. (1951): "Untersuchungen zur Frage der Frostabwehr durch Beregnung." *Wasser und Boden, No.* **4**, 1–7.
(21) MODLIBOWSKA, I. (1953): "Some experiments in 'washing off' the hoar frost." *Rep. E. Malling Res. Sta. for 1952* (1953), 73–77.
(22) ROGERS, W. S., MODLIBOWSKA, I., RUXTON, J. P. & SLATER, C. H. W. (1954): "Low temperature injury to fruit blossom. IV. Further experiments on water-sprinkling as an anti-frost measure." *J. Hort. Sci.* (In the press.)

PLANTS AND PROBLEMS

THE Society's Gardens at Wisley receives large numbers of inquiries from Fellows relating to the naming and cultivation of flowering plants, fruit and vegetables, the identification and methods of control of pests and diseases, the eradication of weeds and other cultural problems. It has been thought advisable to publish in the JOURNAL some of these queries with the replies they have elicited from the Society's Staff at Wisley for the guidance of other Fellows who may have the same problems in their gardens.

DESTRUCTION OF TREE STUMPS

1. *Question.* Can you please suggest methods of destroying tree stumps and suckers on a piece of ground which will eventually be converted into a garden?

Answer. Often this is a difficult problem. At present there is no doubt that the only really satisfactory method of destroying tree stumps is to pull them out. This work is best done under contract with a local firm having equipment to do the job quickly and efficiently.

The stumps of many trees such as Elm and Poplar will start to sucker if they are not dealt with after the tree is felled. In addition to suckering the stumps will harbour garden pests and diseases particularly the Honey Fungus. Occasionally some gardeners convert old stumps into features of various garden designs or try to hide them by plantings of shrubs. Generally speaking these are not good practices and, even apart from the reasons given above, the results are usually disappointing.

In cases where the old stump is left in the ground, shoots from it and any suckers can be killed with repeated applications of 2 : 4 : 5-Trichlorophenoxyacetic acid, commonly known as 2 : 4 : 5-T. This is a hormone preparation and therefore one that will not affect plants nearby *if* it is used according to the maker's instructions. It may be obtained in the trade, a formulation being available through any well-known sundriesman. An alternative substance to use is sodium chlorate. In this case a series of holes is bored around the circumference of the cut surface and the holes filled nearly level with crystals of the chlorate. The holes are then topped-up with water and left. As with the other method, repetition of the practice is necessary until the desired result is obtained. To kill suckers, one pound of sodium chlorate is dissolved in a gallon of water and the solution applied to the foliage on a warm, dry day. In recommending this chemical it should be pointed out that it is toxic to all forms of plant life and must be used with great care. Also it must be remembered that

clothes which are saturated in the solution and dried are highly inflammable.

We know of no chemical preparations which will hasten the disintegration of dead tree stumps.

RHODODENDRON PROPAGATION

2. *Question.* What are the differences between Rhododendrons raised from seeds, from layers, and from grafts on to a *R. ponticum* root-stock as regards—

(*a*) the quantity of flower produced by each ;
(*b*) the relative size of each when fully grown ;
(*c*) the probable length of life of each?

What proportion of seed from a hybrid Rhododendron such as 'Britannia' or 'Pink Pearl' will exactly reproduce the parent?

Answer. Rhododendrons raised from seeds. If the seeds be of a species the resulting plants will be more or less like the parent. If the seeds be of a hybrid such as 'Britannia' or 'Pink Pearl' probably none would be exactly like the parent and possibly the whole progeny would be inferior to the parent.

Rhododendrons vegetatively raised by layers. Whether of species or of hybrids, layers will exactly reproduce the parent and layering is the ideal method of increasing hybrid Rhododendrons. Layers usually flower early in life.

Rhododendrons grafted on to a R. ponticum rootstock. This is the method generally employed by nurserymen. Very fine plants can be produced in this way, but great care must be taken always to remove all sucker growths which may develop from the root-stock. If this is neglected such suckers will become rampant and eventually smother the grafted hybrid scion.

The quantity of flowers produced by plants from each of these methods of propagation will be governed by the culture of the plants. Hardy hybrids, especially, must have all blooms removed immediately they have withered to enable young growths to develop quickly and to form flower buds before the winter. Annual top-dressing of compost of an acid nature together with liberal supplies of water during dry periods will help to ensure an abundance of bloom. Rhododendron species vary considerably in the amount of flower they produce. The same must be said of the relative size the plants will attain from each of these methods of propagation, but the majority of hardy hybrids eventually (after 60–70 years) will attain a height of 20 feet. The length of life of plants from these methods of propagation varies considerably. Dwarf alpine species seed very freely and have a comparatively short life whilst arboreal species such as *R. arboreum* grow to great heights and live to an old age.

There are such Rhododendrons in Scotland which are known to be over 100 years old.

PLANTING OF GLADIOLUS CORMLETS

3. *Question.* Will you kindly give me some information on the above? There is one other point I would like to ask. I have a stock of bulblets, most of them from the expensive corms from America, Australia, New Zealand and Canada. I was unable to plant these earlier and have them still to hand (early July).

I have been wondering if these can still be put into the ground and left in throughout the winter. I have noticed that on that particular ground where I am growing Sweet Peas and Tomatoes this season, and where last year I had my Gladioli and also a cormlet bed, there are now hundreds of cormlets coming up in the Sweet Pea beds and the Tomato beds. Would it be correct for me to plant all the cormlets now and leave them in the ground through the winter, covering the beds with a layer of peat?

Answer. We think you would be best advised to plant your Gladioli cormlets as soon as possible for they should have been planted in late April. We would advise you to plant them in a cold frame so that you can place the lights over them during the winter. If you have no frames, plant outside as you suggest and then cover with a layer of peat after the first frosts have killed the tops of the plants down to ground level.

If you leave the cormlets out of the ground until next spring they will most probably wither up and so would not grow when you planted them.

POTATOES AS A CLEANING CROP

4. *Question.* I often hear it said that Potatoes are a "cleaning" crop. Can you tell me whether they do in fact clean the soil, and if so, in what way?

Answer. The reasons that Potatoes are considered to be a cleaning crop are that the ground has to be well cultivated before they are planted and that during the growing season they have to be hoed and earthed up thus killing a further crop of weeds. Moreover, the Potato tops usually cover the ground and thus reduce weed growth in the later part of the season. Finally, the ground has to be moved again when the crop is lifted. This disturbing of the ground several times in one year gives weeds a poor chance of growing and seeding.

When using Potatoes as a cleaning crop it should be noted that land which is in poor heart should be given a dressing of fertilizer before planting. The following fertilizer is one that can be used: 2 parts of superphosphate of lime, 1 part sulphate of potash, 1 part sulphate of ammonia at the rate of 1½ lb. to a

30-foot row. If growth is not satisfactory at the time of earthing up, the land may be dressed with ¼ lb. of sulphate of ammonia per 30-yard row and hoed in when the earthing up is undertaken.

SAVING SEED OF GARDEN PEAS

Question. I understand that Peas are self-fertile. Is this so in all circumstances? I have two rows of different varieties growing within four feet of each other and I would be grateful if you could tell me whether it is safe to save the seed.

Answer. Peas are self-fertile and therefore it is safe to save the seed. However, we would not recommend that you save your own seed for more than two to three years as without constant re-selection the stock of any variety is likely to deteriorate.

PLANTING DATES FOR OUTDOOR TOMATOES

6. *Question.* Some friends and I have been having a discussion on the proper time to plant Tomatoes out of doors, and we would be grateful for your opinion.

As no doubt you are aware, the Ministry of Agriculture recommends planting out from May 14th to June 7th (Grow-more Leaflet No. 1). Our own experience is that in this district (Potters Bar) it is risky to plant before about May 21st and optimistic to plant later than June 7th. The discussion really concerns the merits of the early dwarf varieties, in particular, 'Amateur.' Is this variety so "early" that, with reasonable hope of a crop, it can be planted as much as three weeks later than others? We understand that it has been under trial at Wisley, so we hope that you will be able to tell us whether the Ministry's recommendations may be modified in this way for this particular variety.

Answer. In general for the south of England we recommend planting outdoor Tomatoes at the end of May or the beginning of June. For the variety 'Amateur' these dates would be suitable. As it is not a particularly early variety, its main weight of crop being harvested in September, it would not be advisable to plant much after the end of the first week in June if the full crop is expected to be harvested.

PLANTING CORDON APPLES AND PEARS

7. *Question.* I should be much obliged if you would advise me as to the best method of planting Apple and Pear trees. The trees will be cordons and I want to know whether you recommend vertical planting or planting at an angle in which case the trees would be trained along a horizontal wire. My soil is light, but I think fairly good, and is slightly acid reading from 6 to 6·5. If you advise planting at an angle, at what distance apart do you recommend spacing the trees?

Answer. The cordons should be planted at an angle of about 45 to 50 degrees to the ground. Ideally the rows should run north and south, the cordons being planted with their tips pointing to the north or as near north as circumstances allow. This position ensures a maximum of sunlight for the whole length of each cordon. The spacing recommended is 2½ feet between cordons and 6 feet between rows.

NEW SEEDLING FRUITS

8. *Question.* I have a seedling Apple tree which this year has carried about 18 lbs. of apples. It appears to be quite a good fruit, and I have shown one or two specimens to the City Council Horticultural Adviser, and he has advised me to get in touch with you with the object of submitting the fruit for classification and your opinion of its worthiness. You will no doubt inform me of the necessary procedure, etc.

Answer. The Society's Gardens at Wisley does not undertake the examination of new seedling fruits. This work is carried out by the Society's Fruit and Vegetable Committee which meets in London at the Fortnightly Shows. We suggest that you submit a sample of your seedling before this Committee. You can get full particulars, entry form and dates of meetings from The Secretary, The Royal Horticultural Society, Vincent Square, Westminster, London, S.W.1.

SWOLLEN VIOLET LEAVES

9. *Question.* The leaves of several varieties of my Violets are conspicuously swollen. What is the cause and is there any remedy or must I burn the plants?

Answer. The malformation of the leaves is caused by the Violet Midge, *Dasyneura affinis*. Numerous orange-coloured larvae may be found within the rolled margins of the swollen leaves. When fully fed, the larvae spin papery cocoons inside the gall. From these the winged adult midges emerge and the fertilized females lay eggs in the rolled margins of the leaves. There are at least three overlapping generations a year, so that control measures may have to be repeated several times. Nicotine dust applied at air temperatures above 65° F. should kill the larvae within the curled leaves if used at the first signs of attack.

CATERPILLAR IN APPLE BRANCH

10. *Question.* When pruning I discovered a grub in the centre of an Apple branch. It was cream in colour and nearly 2 inches long. Would you please identify it? I enclose a specimen.

Answer. The caterpillar is that of the Wood Leopard Moth, *Zeuzera pyrina*, which is often found tunnelling in the branches

of Apple, Lilac, etc., where its depredations are betrayed by wilting shoots and the presence of sawdust. The caterpillar is creamy-white in colour, marked with black spots. When fully fed, after about two years, it attains a length of 2 inches. Pupation takes place in the burrow and the adult emerges shortly afterwards. The moths, which are handsome greyish-white creatures speckled with black, are on the wing in July. Eggs are laid on the bark of the host plants and the young caterpillars burrow into the wood. Dead wood should be cut out, but if it is necessary to kill the larva without removing the branches, this may be achieved by placing crystals of Paradichlorobenzene in the hole, and sealing it in with putty.

DAMAGE TO CYCLAMEN CORMS

11. *Question.* What are these grubs found tunnelling into the base of my Cyclamen corms, and how can I get rid of them?

Answer. These are the grubs of the Vine Weevil, *Otiorrhynchus sulcatus*, which are frequently found damaging the roots of pot plants such as Cyclamen, Primulas and alpines. They are cream in colour, legless and wrinkled, with a shining, brown head. They feed throughout the winter and pupate in early spring, giving rise to dark brown adult weevils a few weeks later. The adults do not attack the roots but feed on the leaf margins, producing a characteristic scalloping effect. Eggs are laid and a new generation of larvae attack the roots. Such depredations may be prevented by incorporating a dust of Dichlorodiphenyltrichloroethane (D.D.T.) in the compost. The usual rate is 8 ozs. of 5 per cent. of D.D.T. dust to one bushel of compost. If larvae are found at a time when it is not convenient to disturb the plants an emulsion of Benzene Hexachloride (B.H.C.) may be watered in at the rate of ¼ pint per plant. The B.H.C. emulsion should be made up according to the manufacturer's instructions.

MALFORMATION OF AZALEA LEAVES AND FLOWER BUDS

12. *Question.* What is causing the white swellings on the leaves and flower buds of my *Rhododendron Simsii*?

Answer. The trouble with your Azalea leaves is known as Azalea and Rhododendron Gall and is due to the fungus parasite *Exobasidium vaccinii*. It is common on pot-grown Rhododendrons of the type grown under the name 'Azalea indica' and on small-leaved Rhododendrons growing out of doors. The fleshy galls vary in size from a pea to a small plum and the white coating is due to the fungus forming its spores all over their surface. Both leaves and flower buds may be affected in this way. The

remedy is to cut out and burn the galls if possible before they turn white and in serious cases we would advise that this be followed by spraying with Bordeaux mixture or with a solution of Colloidal Copper, which can be obtained from any horticultural sundriesman.

CORE ROT IN GLADIOLUS CORMS

13. *Question.* My Gladioli go rotten in store and the corms seem to have a white fungus under the scales.

Answer. The disease which is destroying the Gladioli is Core Rot caused by the fungus *Botrytis gladiolorum*. This is a serious disease of Gladioli and is often responsible for great loss among stored corms. It is essential to store the corms in a cool and airy but frostproof place. Dusting with a fungicidal dust would be a wise precaution. Other important points are to change the site for next season, to examine stocks and discard diseased corms before planting, to remove at once any plant which dies back in early summer, and at harvest time to dry off the plants quickly.

NOTES FROM FELLOWS

Eucryphia 'Nymansay'

THE photograph (Fig. 11) shows a plant of this Eucryphia growing in the garden of MR. W. I. WHITAKER, Pylewell Park, Lymington, Hants. It was planted in 1928 facing east with a belt of trees behind it to shelter it from the strong south-west winds. It flowered very freely in 1951 but produced only a few flowers in 1952. It flowered again very freely this year, and its height is 40 feet. There were only a few flowers on it up to 1945, and from then onwards it flowered very freely every other year, and was just as free flowering in 1949 and 1951 as it was this year.

W. F. HAMILTON

Sophora tetraptera

Sophora tetraptera is a very common tree in this particular locality, to the extent that whole hillsides which have been specially favoured of nature become a blaze of gold in the month of October. As one might expect, there is quite a variation in what one might term horticultural value between different trees of the same species, and this year I saved a quantity of seed from one particular tree, growing isolated from its fellows, which has over a period of years proved exceptionally floriferous, with flowers a little larger than average, and of a good deep gold rather that the greenish yellow sometimes met with. This seed I am making available free of charge to any Fellows who care to send me their names and addresses.

To anyone unfamiliar with this beautiful tree, a few notes may be of

interest. It is a semi-evergreen, losing its leaves only for a month in the spring that it may better display its mass of rather unusual flowers. It will stand any amount of wind and drought, and thrives on a variety of soils, from rich alluvial flats to some of our poor volcanic types, and even on steep 'papo' or mudstone faces where soil, as is commonly understood by the term, is quite non-existent, though it is perhaps most at home on the rather heavy clay soils derived from this mudstone, which by the way is usually quite well supplied with lime. The main requirements for success with this species, and the closely allied *S. microphylla*, would seem to be good drainage, a share of the sun, and no impervious obstacle to its deep rooting system. Faster growing than most New Zealand trees, an ultimate height of 40–50 feet is usually reached, though it may possibly not have proved quite so vigorous in your harder English climate.

One very great thing in favour of its extensive cultivation is that it forms the perfect canopy for providing light shade for such objects as Rhododendrons, Camellias, Lilies, and a host of others, for the leaves are never so dense as to keep off too much light or hold too much of a summer shower, and its deep rooting system and almost complete absence of surface feeders render it a non-competitor against the ordinary plant in its search for nutriment.

Sophora microphylla also grows well here, though not in such abundance. It is, perhaps, a slightly more graceful tree in habit, with its finer leaves, and more pendent branchlets, but fails to make quite the display of flower of *tetraptera*. But the two plants are so very similar that there is little to choose between them, and the Maori referred to both by the one name 'Kowhai.'

A. F. BAKER

'Kupenga,' P.B.,
Gisborne,
New Zealand.

Ceanothus velutinus

Ceanothus velutinus Dougl. seems to be little known as a garden shrub or small tree. The variety *laevigatus* is native to Vancouver Island and grows into an attractive evergreen tree under garden conditions. The specimen in my garden is some fifteen years old. It is near a west wall and is now about 15 feet high. The habit is graceful and the foliage a striking dark green. The leaves, broadly elliptical and strongly trinerved, have a lustrous upper surface due to the excretion of a gummy substance with a pleasantly aromatic scent. The white flowers, of the usual Ceanothus type, are profusely borne in large upright conical inflorescences in May. The tree appears to be perfectly hardy and is well worth garden space.

C. BERKELEY

R.R. 1 Wellington,
Vancouver Island,
B.C.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1953

DELPHINIUMS

Delphinium 'Kingswood' A.M. June 23, 1953, as a variety for exhibition. Flower spikes 35 inches long, 5 inches across at base, well proportioned. Flowers 3 inches diameter outer petals Butterfly Blue (H.C.C. 645/2) inner petals Butterfly Blue (H.C.C. 645/2) touched with Mauve (H.C.C. 633/1), eye white. Raised and shown by Messrs. Blackmore & Langdon, Twerton Hill Nursery, Bath.

Delphinium 'Charon' A.M. July 7, 1953, as a variety for exhibition. Flower spikes 35 inches long, $5\frac{3}{4}$ inches across at base, well proportioned, well spaced semi-double flowers. Flowers $2\frac{3}{4}$ inches diameter, near Gentian Blue (H.C.C. 42) fading slightly with age, eye sepia with yellow hairs. Raised and shown by Messrs. Blackmore & Langdon.

IRIS

Iris tingitana 'Highdown' A.M. April 28, 1953. Flower well proportioned; standard 3 inches long, slightly creped, very erect, a shade of blue near Hyacinth Blue (H.C.C. 40); falls 3 inches long, drooping, Flax Blue (H.C.C. 642) with a patch of Lemon Yellow (H.C.C. 4). Style branches broad, close down on haft, tips recurving, near Moorish Blue (H.C.C. 739/1). Shown by Colonel F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea, Sussex.

ROSES

Rose 'Bloomfield Abundance' A.M. September 8, 1953. A shrub Rose raised by Mr. George C. Thomas in California, U.S.A., as the result of a cross between 'Sylvia' and 'Dorothy Page Roberts.' It produces 4–5 feet long branching sprays of abundant double miniature Porcelain Rose (H.C.C. 620/3) flowers from June to October. It was previously known as ' Cécile Brunner Major.' The robust foliage is borne well down the growths. Shown by Messrs. T. Hilling & Co., The Nurseries, Chobham, Woking.

Rose 'Molly Bishop' A.M. October 6, 1953. A H.T. variety of good size and substance with well formed fragrant fully double salmon pink flowers. The colour pales towards the base of the petals, where there is a faint flush of pale orange. Raised and exhibited by Mr. Herbert Robinson, Victoria Nurseries, Burbage, Hinckley, Leics.

Rose 'Pink Grootendorst' A.M. September 8, 1953. A shrub Rose of the rugosa hybrid section raised in Holland by Messrs. F. J. Grootendorst & Son. It is a sport from 'F. J. Grootendorst' and makes a large rounded bush bearing trusses of many double spinel-pink (H.C.C. 0625) flowers with serrated edges to the petals, from May to October. Shown by Messrs. T. Hilling & Co., The Nurseries, Chobham, Woking.

ORCHIDS

Angulocaste 'Tudor' F.C.C. August 25, 1953. This fine hybrid was obtained by crossing *Lycaste* 'Queen Elizabeth' with *Anguloa Clowesii*. It has a large flower 5 inches across with broad lateral sepals. The colour of the sepals and petals is pale yellowish-green with a flush of pink. The creamy white lip has a golden crest with a deep orange throat, both overtopped by a prominent column. Exhibited by Sir Wm. Cooke, Bt., Wyld Court, Hampstead-Norris, Newbury, Berks.

× **Laeliocattleya 'Lorraine Shirai' 'Harvester' A.M.** October 20, 1953. This orchid was obtained by crossing × *Laeliocattleya* 'Derna' with × *L.-c. luminosa*. The plant exhibited bore one large flower 5 inches by 5¼ inches. The sepals and petals are an attractive yellowish ochre while the large lip has a fimbriated margin and is a deep velvety Tyrian Purple H.C.C. 727. Exhibited by Messrs. Armstrong & Brown, Orchidhurst, Tunbridge Wells.

× **Potinara 'Red Friar' 'Rainbow' A.M.** October 20, 1953. This variety of the multiple generic hybrid × *Potinara* was raised from the cross × *Brassolaeliocattleya* 'The Friar' and × *Sophrolaeliocattleya* 'Vulcan.' A plant bearing two flowers was exhibited and each flower measured 5½ inches across by nearly 6 inches vertically. The sepals and the two wide petals are basically coloured with light purple delicately suffused with brown. A streak of Rhodamine Purple H.C.C. 29/1 runs down the main vein. The large lip is mainly coloured Beetroot Purple H.C.C. 830/3, and in addition an orange yellow flush occurs around the white column. Exhibited by Messrs. Black and Flory, Ltd., Slough.

Vanda × 'Madame Dinger' 'Elizabeth' A.M. October 20, 1953. A very large plant of this hybrid Vanda whose parents originate from Indonesia was exhibited. A large spike bearing nine flowers was situated near the top of the 2½ feet stem. The flowers are attractively coloured in two distinct shades. The sepals and petals are pale heliotrope with darker spots present on the upright sepal, while the lip is pale fawn on the lower half graduating to pale yellow towards the base. A few dark reddish markings are also present on the lip. Exhibited by Messrs. Sanders (St. Albans), Ltd., St. Albans.

BOOK NOTES

"In your Garden Again." By V. Sackville West. Demy 8vo. 178 pp. Illus. (Michael Joseph.) 15*s*.

Miss Sackville-West puts us doubly in her debt. First, week by week she writes lively and instructive articles in the *Observer* and then in due time gathers them together in a volume worthy of a place on the shelves beside the classics of discursive garden writing of Canon Ellacombe, Mrs. Earle, Eden Philpotts and others. This one appears at a particularly appropriate moment, for the November, 1953, issue of the JOURNAL of The Royal Horticultural Society contains an illustrated account by Miss Sackville-West of the garden she herself has made at Sissinghurst Castle, showing the distinguished horticultural background against which these articles are written.

In one of them Miss Sackville-West tells of a Christmas party at which she saw a plant of the type form of *Cyclamen persicum*. It is extremely interesting to find a

novelist of such distinction as Miss Sackville-West applying the epithet "Jane-Austen-like" to this little plant and so perpetuating what I call the "country-rectory" conception of Jane Austen. Jane Austen certainly was no "flaunting, extravagant quean" like the "big Christmas present cyclamen" as Miss Sackville-West calls the florists' hybrids, but I do not quite feel that the other adjectives she employs, "shy, unobtrusive, demure" to describe the *Cyclamen persicum* type are quite those for Jane Austen, who for all her delicacy of perception had a considerable toughness and astringency. I do not think, either, that she would, like *Cyclamen persicum*, have felt rather frightened at finding herself in more sophisticated company at the party. No, like Miss Sackville-West, she would have written a highly entertaining account of it, champagne cocktails and all.

This is a vastly diverting book with all the garden wit, wisdom and learning of its author. It is also an assurance for the future. However gloomy the outlook or depressing the news, so long as Miss Sackville-West writes her column in the *Observer* gardeners will have something to cheer them up on Sunday mornings.

MORTON

"The Complete Book of the Dahlia." By Roy Genders. 122 pp. Illus. (Saturn Press.) 12*s*. 6*d*.

The Author seems to have tackled the subject in a very businesslike manner. The book should be a useful guide to the Amateur Grower as well as the Professional who wishes to grow Dahlias for the first time.

Up to Chapter 8 the material is excellent, but the Author appears to have erred slightly after Chapter 7.

For instance, in Chapter 8, the Author seems to have indicated that it is quite an easy matter to grow Dahlias under glass and produce some excellent blooms in May. From my own experience Dahlias are not easily produced in April, May and early June under glass as the temperature fluctuates too much, which results in many open flowers being produced.

Another point regarding disbudding and debranching: I think this is very necessary if done on a moderate scale, as it produces better quality flowers and at the same time it does not lessen the show of bloom. At Wisley it has been found that some plants can carry too many blooms which result in the flowers losing their shape and characteristics.

Chapter 9. The Author has listed some excellent varieties but unfortunately he could not have followed the National Dahlia Society's Classification, as there are several mistakes. For instance, the variety 'Brandaris' is listed with the Giant and Large Decoratives which are 8-inch flowers and over. 'Brandaris' is a Medium Decorative which only produces flowers of 5–6 inches diameter. 'Leighton 'and 'Sheila Brunton' are Small Flowered Cactus. 'Jean Lister' is a large Pompon and not a Small Decorative. 'Reedley' is a Medium Decorative not a Small.

Taking everything all in all the Author has produced a very useful edition which has been based on sound common sense and has not tried to make the public believe that the Dahlia is the most difficult flower to grow.

STUART OGG

"A Diversity of Plants." By Patrick Synge. Med. 8vo. 144 pp. Illus. (Bles.) 16*s*.

It is to be expected that a book on gardening by an editor of The Royal Horticultural Society's publications would be good, and when he indeed writes a good one, the fact that he is responsible for what appears in these pages is not to inhibit a reviewer from praising it. For *A Diversity of Plants* is very good indeed. It contains admirably thought-out and written chapters on "Changes in Gardening Methods," "Magnolias and Camellias," "Azaleas and Wild Shrub Roses," "Paeonies," "Geraniums and Pelargoniums," "The Busy Man's Garden," "The Beauty of Bark and the Value of Green," "A Gardener's Library" and many other interesting garden matters. This book is an excellent example of the kind of discursive garden writing which has always given such pleasure, and is of special interest as being by a representative of the younger generation of gardeners, and inspired by the preoccupations and ideals of modern gardening.

MORTON

"Old London Gardens." By Gladys Taylor. Med. 8vo. 194 pp. Illus. (Batsford.) 21*s*.

Miss Gladys Taylor has written an account of gardening in London and its suburbs as represented by the gardens of the great and the unknown throughout the

capital's history. It is packed with a mass of historical detail pleasantly presented to be of interest to the amateur of history and horticulture alike.

An historical point, however, must be questioned. On p. 147 Miss Taylor states that in the early years of the 19th century "the advent of so many new flowers from foreign countries gave rise to the practice of 'bedding out'" and that Geraniums, Calceolarias, Lobelias and Salvias were used for this purpose. Certainly Calceolaria and Salvia were introduced in the first half of the last century, but *Pelargonium zonale* from which most of the scarlet "Geraniums" were derived was introduced in 1710 and *Lobelia Erinus* in 1759. But, furthermore, in general surely the reverse happened. The bedding craze was abandoned when it was recognized that the most enduringly satisfying gardens are to be created from permanent plants, beautiful in flower, form or foliage, and this was emphasized by the vast numbers of hardy plants introduced into this country towards the end of the last century and in the beginning of this.

This well produced book is illustrated with delightful reproductions of paintings, drawings and prints. Altogether an agreeable gift-book.

MORTON

"Better Roses." By Dr. A. S. Thomas. 296 pp. Illus. (Angus & Robertson, Sydney and London.) 19*s*. 6*d*.

Though written for primarily Australian and New Zealand conditions, this book merits a much wider public. As President of the National Rose Society of Victoria, Dr. Thomas is one of the world's leading authorities on the Rose and was presented with the Dean Hole Memorial Medal on his visit to England in 1953. His approach is never insular, but must be considered international in the best sense, references being made throughout to research on Rose problems undertaken in other countries.

Every aspect of Rose growing is discussed in considerable detail. The author examines fundamentals and his conclusions are the more convincing in that he is definite without being dogmatic. Hybridizing, perfume and the history of the Rose are allotted separate chapters. Pests and diseases, so frequently inadequately treated in Rose literature, receive their proper share of attention. Dr. Thomas is familiar with many specifics used in this country, including salicyanilide for powdery mildew, though thiram is not mentioned and I was unable to trace any reference to B.H.C. as an aphicide. (*Better Roses* was first published in 1950 which may account for these omissions.)

Much of the advice given is equally applicable to English conditions and there can be few, if any Rose growers, whether amateur or professional, who would not learn something from a careful study of this stimulating work. I am glad to say that production is in no way inferior to the excellence of the text. There are numerous line drawings and half-tone photographs (the latter of a very high standard), also eight colour plates of individual varieties. Typography and layout are first class and the Index is apparently faultless.

N. P. HARVEY

"A Constance Spry Anthology." 112 pp. Illus. (J. M. Dent & Sons, Ltd. and Hulton Press.) 18*s*.

Mrs. Spry's previous books on flower decorations are well known and appreciated and she has now presented another, but in rather a different manner. True, there is much about management of blooms and foliage for decorative purposes, but it also contains many good ideas and useful thoughts that spring from an alert mind. Not all the illustrations are as nice as those opposite pp. 25 and 77.

The description of a Victorian "at Home day" towards the end of the book will surely amuse some who remember those far-off times.

After perusing these pages for an hour or so one feels as if one has had an interesting and instructive conversation with a particularly gifted human being.

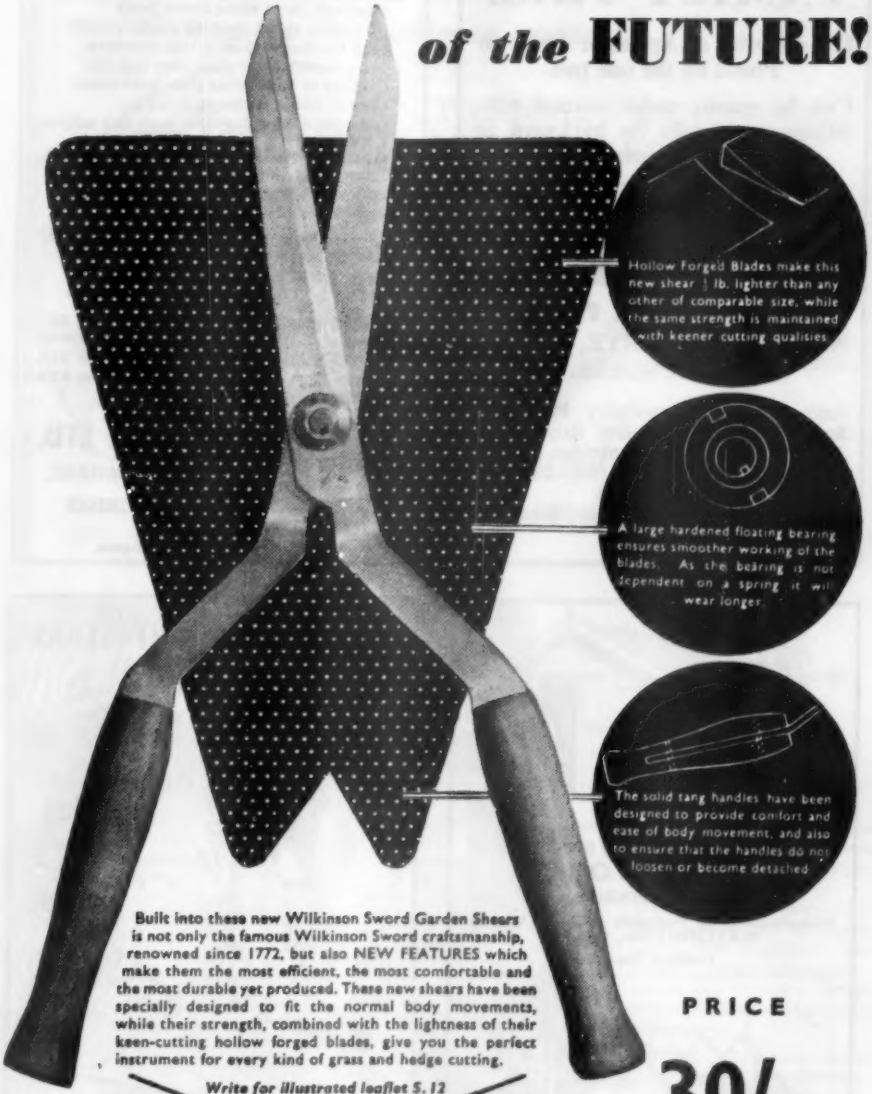
FRANK GALSWORTHY

ORDERS FOR BOOKS

The Society does not sell any publications other than its own. Orders for books reviewed should therefore be sent direct to the booksellers and not to the offices of the Society.

The contents of this volume are copyright. For permission to reproduce any of the articles application should be made to the Council.

Announcing . . .
the GARDEN SHEAR *of the* FUTURE!



Hollow Forged Blades make this new shear ¼ lb. lighter than any other of comparable size, while the same strength is maintained with keener cutting qualities.

A large hardened floating bearing ensures smoother working of the blades. As the bearing is not dependent on a spring it will wear longer.

The solid tang handles have been designed to provide comfort and ease of body movement, and also to ensure that the handles do not loosen or become detached.

Built into these new Wilkinson Sword Garden Shears is not only the famous Wilkinson Sword craftsmanship, renowned since 1772, but also NEW FEATURES which make them the most efficient, the most comfortable and the most durable yet produced. These new shears have been specially designed to fit the normal body movements, while their strength, combined with the lightness of their keen-cutting hollow forged blades, give you the perfect instrument for every kind of grass and hedge cutting.

Write for illustrated leaflet S. 12

PRICE

30/-

WILKINSON SWORD

(Patents applied for)

Available from all stockists.

THE WILKINSON SWORD COMPANY LIMITED, ACTON, LONDON, W.4

INTRODUCING THE FAMILY TREE

Five varieties of Apples or Pears or Plums on the one tree

Can be grown under normal conditions, or in tubs for backyard or roof garden

Fully descriptive leaflet sent free on request from :

PEARSON & SON

FRIARS' COTE FARM
NORTHIAM, Nr. RYE, SUSSEX
Tel. 3132 Northiam

Also noted for Strawberry Plants for Spring delivery: Certified Royal Sov., Auch. Climax and Cambridge 422 at **5/-** doz., **9/6** 25, **17/6** 50, **25/-** 100, **£6 10s.** 1,000
Including good packing in moss and postage

CHOICE BORDER PHLOX

For a brilliant display from July-September, plant these outstanding new large-flowered varieties from October to March

Admiral, rich cerise self, enormous pip
Alda, soft paeony purple, dwarf
Amethyst, large violet flower heads
Brigadier, an outstanding orange red self
Cecil Hanbury, glowing orange-salmon
Daily Sketch, light pink, deep rose eye
Duchess of York, clear pink, light centre
Lady L. Bloss, cerise pink, red eye
Lady Buchanan Jardine, large rich salmon pink
Sir J. Falstaff, enormous salmon-pink flowers
Spitfire, suffused orange salmon
Spatrot, scarlet, late flowering

All the above varieties 2/6 each Packing and carriage, please add 1/6 for orders under £1.

The BIGNOR collections of Phlox

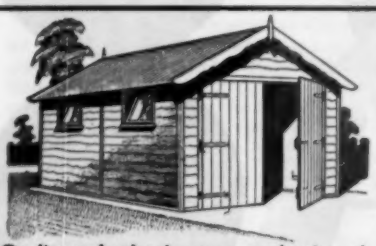
All carriage paid

12 strong plants in any 4 varieties listed 25/-
Double collection 47/6
12 strong plants, 1 of each of above 27/6
Double collection 52/6

We specialise in border planning.

F. TOYNBEE LTD.
CROFTWAY NURSERIES,
BARNHAM, SUSSEX

Send for our illustrated catalogues.



Quality and value in every production of
W. STANMORE'S
Garden Furniture
Manufacturer & Portable Building Works
WATLINGTON, OXON
Leaflet on Request

GREENHOUSE by W. STANMORE, WATLINGTON

GARDEN WITHOUT TEARS

BY MACHINE

FARMFITTERS LTD. (U)
GERRARDS CROSS, BUCKS.
THE GARDEN MACHINERY PEOPLE

SEEDS FOR ALL SOILS AND CLIMATES

Grown on the pedigree system

BY APPOINTMENT SEEDSMEN TO THE LATE KING GEORGE VI

TOOGOOD'S HANDSOMELY ILLUSTRATED CATALOGUES,

fully describing the best vegetable seeds, flower seeds, and everything for the Farm or Garden, posted freely to applicants.

TOOGOOD & SONS Ltd.

SOUTHAMPTON, ENGLAND

The new CRITTALL "CADET"

RUSTLESS GREENHOUSE

An easily erected greenhouse for gardens where there is not room for the Crittall Aluminium extensible house.

The "Cadet" is made from heavy rolled steel sections electrically welded and completely *rust-proofed by Hot-dip Galvanizing.*

Can be seen at leading London Stores and at Agents throughout the country.

Complete with glass, putty, glazing clips and foundation lugs.

Delivered free by road in England and Wales.

25 gns

Full details from :—

THE CRITTALL MANUFACTURING CO. LIMITED

Horticultural Department C, Braintree, Essex.

JUSTIN BROOKE LTD.

WICKHAMBROOK, Nr. NEWMARKET, SUFFOLK

We invite you to visit our nurseries and fruiting orchards at any time, including Sundays—preferably by appointment.

We have a large acreage of nursery stock, including Peaches, Nectarines, Apricots, Cherries, Apples, Pears, Plums and Figs.

In our fruiting orchards you can see the results obtained by planting similar stocks of all these fruits; and you can see the results at various stages of growth.

PEACHES ON PEACH STOCK

Telephone :

In office hours—Wickhambrook 200 Out of office hours—Wickhambrook 304

UNWINS OF HISTON

Seeds of Quality

Beauty is too important a thing to be left to chance. So don't choose your seeds by the picture on the packet; go by the *name*. And remember, the name "UNWINS OF HISTON" is recognised by *gardeners themselves* as a first-class guarantee of success.

Our catalogues are fully illustrated, helpful and informative. Write for your free copy today.

W. J. UNWIN LTD. HISTON · CAMBRIDGE

MORTEGG

is still the finest

TAR OIL WINTER WASH

•

Supplied in one, two, five and ten gallon sizes. Larger sizes available on application.

•

Also available

OVAMORT DNC

and

THIOL THIOCYANATE

•

THE MURPHY CHEMICAL COMPANY LIMITED

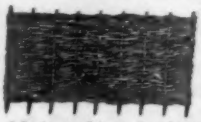
WHEATHAMPSTEAD · HERTS.

CRAVEN WINTER PRODUCTS

"CARBO-CRAVEN" Tar Oil Winter Wash.
"PARA-CARBO" Tar-Petroleum Emulsion.
"WINTER SOLOL" Petroleum Wash.
"CRESOFIN" D.N.O.C. Petroleum Wash, Standard and High.
"CRESOFIN" Double D.N.O.C. Wash.
"CRESOFORT" D.N.O.C. Concentrate Wash.
STOCK EMULSION Washes.
Insecticides and Fungicides for all purposes.

Full particulars and prices apply :

W. J. CRAVEN & CO. LTD., EVESHAM



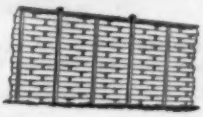
TOP GRADE WATTLE HURDLES

3 ft. high .. 12/-
4 ft. high .. 16/-
5 ft. high .. 21/-
6 ft. high .. 25/6

6 ft. long of best closely woven hazel or willow.

CLOSE BOARD FENCING

3 ft. high .. 31/-
4 ft. high .. 36/-
5 ft. high .. 42/-
6 ft. high .. 47/-



DURABLE INTER-WOVEN FENCING

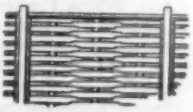
3 ft. high .. 23/-
4 ft. high .. 28/-
5 ft. high .. 34/-
6 ft. high .. 39/-

6 ft. long panels strongly made of selected oak and creosoted.

Immediate Despatch. All prices C.W.O.
Carriage paid England and Wales.

Also SUPERLAP INTERWOVEN FENCING

The horizontal slats OVERLAP making a 1st class 'peep-proof' and extra rigid fence.



CHESTNUT FENCING, GARDEN GATES, GREENHOUSES, SHEDS, etc.

VALE COUNTRY PRODUCTS
(Dept. R.H.S.) WANTAGE, BERKS

WALTER C. SLOCOCK, Ltd.

FOR OVER 160 YEARS

RHODODENDRON SPECIALISTS

AND PRODUCERS OF FIRST QUALITY

ORNAMENTAL TREES AND SHRUBS, FRUITS, ROSES, Etc.

Please write for copies of our CATALOGUES
"RHODOS and AZALEAS" and/or "TREES and SHRUBS"

GOLDSWORTH NURSERY
WOKING .·. SURREY

The Supreme Hard Court

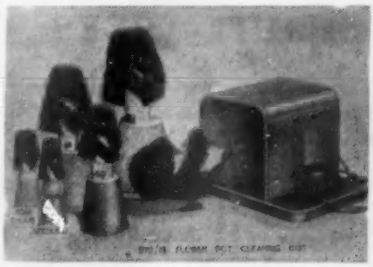
The "Hart" Non-attention Court—designed to combine the best features of the normal hard and semi-loose types. Has a fast gritty surface and requires no maintenance. Colour is a pleasing grey-green. Suitable for play all the year round. Brochures and further details on request.

GARDENS—planned and constructed in all phases. Let us know your requirements early.

MAXWELL M. HART
(LONDON) LIMITED
WINNERSH, WOKINGHAM, BERKS,
'Phone: Wokingham 1121-3

MMH

COOK'S *"Norwich"* BRUSHES
272/15 FLOWER POT CLEANING UNIT



SEEDLING TO TEN-INCH POTS

The 5 Brushes are specially designed and made of Pure Bahia Bass for Wet or Dry Cleaning; fitted with solid Brass precision made flanged adapter; ¼ H.P. Single Phase Motor with Watertight Switch, mounted on Hardwood Base (14" × 10" × 1") with heavy gauge metal cover. **Complete** unit includes:—Seedling, Tom Thumb, Sixty, Forty-eight and Thirty-two* Fitted Pot Brushes. (* This size can be used for 8½" and 10" Pots). With Motor etc. as stated above.

Carriage paid U.K. £20 net cash.

Our Customers Report this is an Economical Proposition. **Spare Brushes** can be supplied. Hand-Pattern Series, see November, 1953, issue R.H.S. Journal. Our new list illustrating 200 Best Hand-Made Brushes with leaflet 272/15 Unit sent on request.

COOK'S
Makers of "Hand-Made" Brushes since 1814
DAVEY PLACE, NORWICH, NORFOLK

Conservatories, Garden Dens...

Garages, greenhouses, loosebox and garden buildings of all descriptions.

Please send for illustrated catalogue.

ALPHA WOODCRAFT LTD.,
Dept. 24, Gutteridge St., Hillingdon Heath, Uxbridge, Middx. *Tel. HAYes 0657*

The MINI-GRINI

Size 18" × 12" × 16" high. A sturdily built electrically heated miniature Greenhouse and Seed Propagator. Designed to germinate seeds, strike cuttings, grow smaller hothouse plants and succulents efficiently and easily. Temperature maintained by ordinary 40-watt light bulb.

Price **49/6** *carr. and pack. free*

Thermometer and suction pad 5/-. Thermostat 22/6 extra. C.W.O. Order NOW or write for leaflet.

The LONDON WINDOW BOX Co. Ltd., (Dept. RHJ) 11, New Quebec Street, W.1

UNUSUAL SEEDS

MAJOR HOWELL invites the attention of Fellows to his comprehensive collection of seeds from many lands. Over 1,500 species are represented including trees and shrubs, alpine, border and woodland plants, stove and cool greenhouse subjects.

Botanical lists are issued from time to time from which selections may be made either on an exchange or payment basis. In addition, to assist those without suitable books of reference, descriptive lists covering an interesting selection from the collection are available.

Please write, enclosing 2½d. stamp, stating your interests so that the appropriate lists can be sent. Enquiries from Overseas particularly welcome.

Major V. F. HOWELL, F.R.H.S.,
Firethorn, Oxshott Way, Cobham, Surrey, England

UNCOMMON VEGETABLES

Peas Mangetout, Petit Pois; Beans Blue Coco, White Predome; Fuseau Artichoke, and a great variety of other interesting Vegetables, together with all the best standard varieties are included in our Free List. Fruit Trees, Roses and Herbaceous plants can still be safely moved. *List on request.*

GEO. BUNYARD & CO. LTD.,
MAIDSTONE. Est. 1796.

LORD WOLMER'S FRUIT TREES

These trees have been known for many years for their outstanding quality and reliability and are all grown on correct rootstocks.

APPLES	PEARS
PLUMS	PEACHES
CHERRIES	NECTARINES

SOFT FRUITS

also BEECHES for Hedging.

Catalogue with much useful information FREE on application to:—

FRUIT NURSERY DEPT. (J.R.H.), BLACKMOOR ESTATE, LTD. LISS, HANTS.

CHRYSANTHEMUMS
HARDY PLANTS & ALPINES

1954 CATALOGUES, with Colour Plates, Detailed Descriptions, Height, Flowering Time, etc., and Cultural Guide

BOTH NOW READY

A MUST FOR ALL GARDEN LOVERS
Send 2½d. Stamp for each copy

OVER 30,000 PLANTS UNDER GLASS

EST. 1877. VISITORS WELCOME BY APPOINTMENT

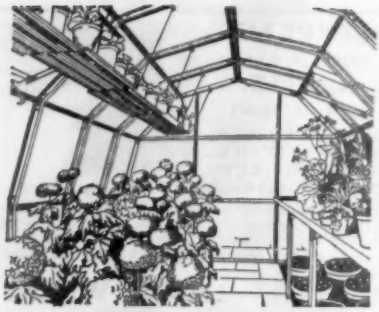
WELLS NURSERIES 5, MERSTHAM, Surrey. Tel. 139

KETTERING LOAM

As supplied for over 30 years to the Leading Horticulturists. Hand Dug Yellow Fibrous, from our own virgin fields. Also Bedfordshire Silver Sand, and Noted Nottingham Marl.

Quotations for any quantity, delivered by Rail, or Road Transport to your door.

KETTERING FUEL CO. LTD.
28a STATION RD., KETTERING, NORTHANTS
Telephone: 3059



The Glasshouse you've been waiting for

THE HARTLEY SEMI-DODEKAGON 9

The Hartley Semi-Dodekagon '9' glasshouse with glass to ground is available 9 feet wide to any length. Built in Aluminium Alloy. Enquiries for the above or our larger glasshouses will receive our prompt attention.

V. & N. HARTLEY LTD., GREENFIELD, Nr. OLDHAM

Awarded Gold Medal for commercial glasshouses, Southport Flower Show 1953

WAKELEY'S

(Registered Trade Mark)

4 FOLD HOP MANURE

Stable manure is scarce but you'll find Wakeley's Four-Fold Hop Manure a perfect substitute—Humus, Nitrogen, Phosphates and Potash—everything the soil needs from seedtime to harvest—to enrich it, and stimulate and sustain plant life and growth.

PRICES :

Small Bag 7/–, Medium Bag 10/6, Large Bag 17/–, 10 Large Bags 165/–, 20 Large Bags 320/–.

Prices subject to alteration without notice.

FROM ALL THE BEST NURSERYMEN AND SEEDSMEN

or carriage paid England and Wales (Scotland 1/6 Large Bag; 1/– Medium Bag; 9d. Small Bag extra). If any difficulty, write to address below.

Write for new season's price list. Booklet of cultural instructions also sent if required.

Our Spring List of Gladioli, Seeds, Plants, etc., is also now ready, free on application.

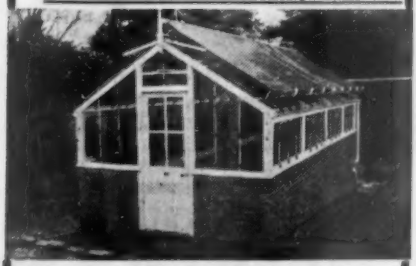
WAKELEY BROS. & CO. Ltd.
235 Blackfriars Rd., London, S.E.1.

STRAWSON

TIMBER-FRAMED

GREENHOUSES

are warmer, kinder to all plant life



We can now supply any type and size of Greenhouse and shall be happy to send estimates and full particulars on receipt of enquiries.

Surveys of Inspection arranged in any part of the country at short notice

Write for List RHJ. 54

G. F. STRAWSON & SON

Builders of Fine Greenhouses since 1892

HORLEY . SURREY *Telephone : Horley 130*

BY APPOINTMENT
SUPPLIERS OF
HORTICULTURAL
CHEMICALS
TO THE LATE
KING GEORGE VI

JOSEPH BENTLEY LIMITED

BARROW-ON-HUMBER, LINCS.

For Winter Spraying use

Bentley's "CREEBOL"

A standard dual-purpose combination of tar oil and petroleum emulsion

1 qt. 4/6 ; ½ gall. 7/9 ; 1 gall. 13/6 ; 2 galls. 23/–; 5 galls. 42/–; 10 galls. 80/–

Carriage paid on 40/– orders and upwards to any Station in Great Britain

Illustrated Catalogue for 1954 post free on request

EARLY

WINTER-FLOWERING SHRUBS

Why have a dull moment, for there is no close season with SHRUBS? Brighten up your winter landscape with :—

Berrying Cotoneaster and Pyracantha. Prunus subhirtella autumnalis (October Cherry). Jasminum nudiflorum (Winter Jasmine). Viburnum fragrans and candidissimum. Hamamelis mollis (Witch Hazel). Chimonanthus fragrans (Winter Sweet). Prunus Davidiana alba (January Peach).

All these are hardy and can be winter planted

BURKWOOD & SKIPWITH LTD

PARK ROAD NURSERIES, KINGSTON, SURREY

Telephone: KIN 0296

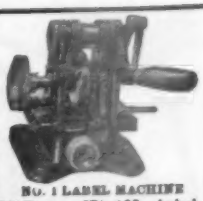
'SERPENT'

INDELIBLE (LEAD)

LABELS

LAST 100 YEARS

NEAT, LEGIBLE, SELF-AFFIXING, ADAPTABLE, COMPLETELY RELIABLE



No. 1 LABEL MACHINE

Printed with *any* names, 3/6 Dozen; 27/–100. Label-printing Machines supplied, from £3 12s. 6d. Send for lists and FREE SAMPLE (*any* name). Complete Label-machine Outfits, from £4 15s. 6d., make IDEAL GIFTS

SERPENT LABEL WORKS

ROCKBEER, EXETER

BAMBOO CANES

All per 100	A. Thin s.	d.	B. Med. s.	d.	C. Stout s.	d.	D. Ex. Stout s.	d.
12 in.	2	6	3	0	4	0	5	0
18 in.	3	0	4	0	5	0	6	0
2 ft.	4	0	6	0	7	6	10	0
2½ ft.	5	0	7	0	10	0	15	0
3 ft.	6	0	8	0	12	6	17	6
4 ft.	10	0	13	6	22	6	27	6
5 ft.	25	0	30	0	35	0	40	0
6 ft.	30	0	35	0	40	0	45	0
7 ft.	40	0	45	0	50	0	60	0
8 ft.	45	0	50	0	60	0	70	0
10 ft.	50	0	60	0	70	0	80	0

Orders up to £1 add 2s. post. Carriage paid nearest station. C.W.O.

THE BRITISH BAMBOO CANE CO. LTD.
52, LANIVET, BODMIN, CORNWALL

London Showrooms 52 "The Cornish Jungle," 228 Strand, W.C.2.(Opp : Law Courts.) CEN. 8195

TARRY'S KETTERING LOAM

Finest top spit taken from our own virgin fields. Also sterilized soil and compost to the John Innes Formula. Quotations by return for delivery in 7/8 ton lorry loads or by rail in small quantities.

V. TARRY

PYTCHLEY LODGE, KETTERING

Telephone : KETTERING 4061

THERE IS NO MORE RELIABLE OR SUITABLE ADJUNCT TO THE WORK OF THE NURSERYMAN OR GROWER THAN

"ECLIPSE" SEDGE PEAT

Prepared and graded for every specific use.

We bring to your notice

"ECLIPSE" RHODODENDRON PEAT

For Rhododendrons, Azaleas, Heathers and other Peat Loving Plants.

Particulars and special Leaflet on request.

ECLIPSE PEAT COMPANY LIMITED
ASHCOTT SOMERSET

TREES

Owners of trees valued for their beauty may find that many have broken limbs caused by gales, snowfalls, etc., and are also carrying a large amount of dead and diseased wood, which affects their health and beauty.

Experienced and fully Insured men undertake :—

Cavity filling. Bracing of Dangerous Branches.
Felling of Dead or Dangerous Trees.
Scientific Pruning. Tree Fertilization.
Removal of Stumps. Pollarding.

Estimates and advice not charged for.

THE SOUTHERN TREE SURGEONS

228, Bensham Lane, Thornton Heath, Surrey. Thornton Heath 3022.

Lloyds Bank Chambers, Oxted, Surrey. Oxted 359.

GROW

ORCHIDS

FOR PROFIT & PLEASURE!

...without the slightest difficulty you can successfully cultivate Orchids. Last year an Amateur Orchid Grower sold over £300 worth of Cymbidium flowers out of his medium-sized Greenhouse —You can do this! Send now for Free 2-colour Booklet 'The Simplicity of Orchid Growing.'

MANSELL & HATCHER LTD.
Dept. R.H., Crazg Wood Nurseries
RAWDON, LEEDS, Yorkshire

"RIVIERA" SCREENING

is split ¾" dia. bamboo bound nearly close by galv'd wires in 10 yds. rolls—59" and 49" wide.

IDEAL FOR SHADE/FROST, GREENHOUSES, FRAMES, ETC.

SIGHT PROOFING TENNIS COURT SURROUNDS.

Fencing & Gates, All types, supplied and fixed. Tennis Court Surrounds, Oak Pale Panels, Hazel & Osier Hurdles. Teak Garden Furniture.

GERALD GILMER LTD.

TEL.: 1640/1 **LEWES** EST. 1922

And at BISHOP'S WALTHAM. Tel. 271

Sutton's of Reading

are pleased to announce that their 1954 Catalogue of

By Appointment
Seedsmen to the
late King George VI

SUTTON'S SEEDS

has now been prepared and that a free copy will be sent to you on request.

Sutton & Sons Ltd., Dept. RJI, Reading

RICHARDSON

TIMBER and ALUMINIUM GREENHOUSES

STOCK MODELS
or any special designs

Richardson Greenhouses supplied for Royal Horticultural Society's gardens at Wisley

WOOD LATH AND OTHER GREENHOUSE BLINDS SUPPLIED TO ORDER

Complete Maintenance Service
(available any district)

Boilers supplied. Heating systems overhauled, repaired, remodelled. General repairs, painting, glazing etc.

Estimates free.

W. RICHARDSON & CO. LIMITED

NEASHAM RD., DARLINGTON

London Office: 117 Victoria Street, S.W.1.

Associated Firms:
J. Weeks & Co. (Chelsea). James Gray (Chelsea).
Simpson & Parmer (Glasgow).

HORTICULTURAL and HEATING ENGINEERS. Established 80 years.

Waterers

OF

THE FLORAL MILE

can supply for early delivery

ROSES

of highest quality in all the leading varieties

BUSHES 4/- STANDARDS 10/6

CLIMBERS 4/6

These can safely be planted until mid-March

SEEDS

Flower and vegetable seeds of finest strains are now to hand from the 1953 harvest

CATALOGUES POST FREE

JOHN WATERER SONS & CRISP LTD

The Floral Mile

Twyford Telephone: Wargrave 224–225 *Berks*

Printed by Spottiswoode, Ballantyne & Co. Ltd., London and Colchester.